March • 1955

finish

THE MAGAZINE OF

Appliance AND

Metal Products MANUFACTURING

FROM RAW METAL TO FINISHED PRODUCT

FORD'S CENTRAL STAFF OFFICE BUILDING USES *90,000* square feet of Porcelain Enamel

Architect: Skidmore, Owings & Merrill, New York

General Builder: Bryant & Detwiler Co., Detroit

COLOR *by "Ceramic"*

Whether Your Order is Large or Small . . . *CALL "CERAMIC"* for Fast Service on Dependable Colors, Chemicals, and Supplies for Enamel, Glass, and Pottery.

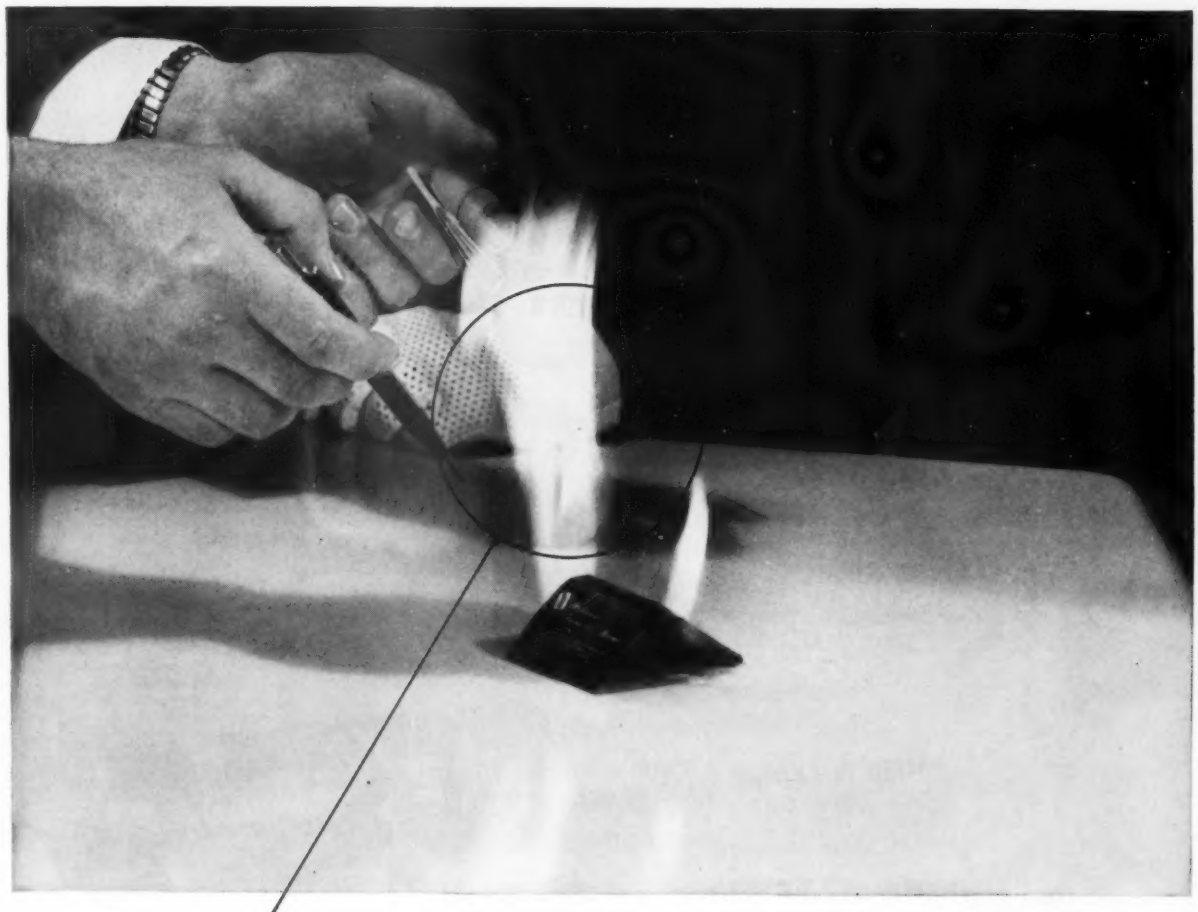
A striking example of the colorful beauty of porcelain enamel curtain wall construction is seen in the new Central Staff Office Building of the Ford Motor Company. Over 7500 spandrel panels, the largest of which are 4'6½" by 3'9½", are enameled, laminated to a ¼-inch honeycomb, insulated with Foamglas, and assembled ready for installation by Ingram Richardson in Beaver Falls, Pa. The installation is the greatest known application of porcelain enamel in a single building.

The panels are enameled in a rich deep green-blue . . . a lifetime finish, non-fading, scratch-resistant, easy to clean, of enduring beauty.

Color is furnished by "Ceramic."

WINNING CERAMIC COLORS TRADE MARK

CERAMIC COLOR & CHEMICAL MFG. CO.
New Brighton, Pa., U.S.A.



* This Flame Can Be a Strong Sales Point for You

A Porcelain Enameled finish offers so many unusual sales features for your products that one of its biggest advantages is often overlooked.

It can take heat. Porcelain Enamel doesn't burn, blister or discolor. Even flames won't damage the surface in any way.

Since this finish is processed at 1550 F, it will withstand any temperature it is likely to encounter in home service. Burning cigarettes or even hot electric irons don't harm its hard, glossy surface.

This is only one of many reasons why Porcelain Enamel gives you extra sales advantages. It is smooth, bright and attractive too—and so easy to keep clean. Colors never "fade"—even after years of use. Acid-resisting Porcelain Enamel is not damaged by fruit juices or alcohol.

UNIFORM QUALITIES

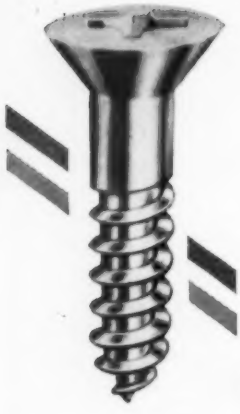
Of course, the metal beneath the Porcelain Enameled surface must have excellent bonding qualities, flatness, and uniform fabricating characteristics. That's why more manufacturers have used more Armco Enameling Iron over a longer period than any other enameling base. That is why too it has become known as the "World's Standard Enameling Iron."

ARMCO STEEL CORPORATION
2924 CURTIS STREET, MIDDLETOWN, OHIO
EXPORT: THE ARMCO INTERNATIONAL CORPORATION

ARMCO

BE SURE WITH *Southern*

PHILLIPS AND SLOTTED WOOD SCREWS



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BY CITIZENS OF THE USA

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MONTHLY TRADE PUBLICATION
Established January 1944
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TErrace 4-5281

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A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. Includes technical and practical information on plant facilities and manufacturing problems from raw metal to safe delivery of the finished product, with special emphasis on fabrication, metal preparation, metal finishing, assembly, and packaging and shipping.

Free controlled circulation to management, purchasing, engineering and key plant personnel in metal product manufacturing plants. To others, subscription price is $5.00 per year, domestic. To all other countries $8.00 per year (U.S. funds).

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BPA NBP

finish

METAL PRODUCTS MANUFACTURING
FROM RAW METAL TO FINISHED PRODUCT

LORD HALL LIBRARY

Rotospraying . . . at Whirlpool

Yes . . . Rotospraying is the accepted method of sieving enamel slip at the Clyde Porcelain Steel Div. of the Whirlpool Corporation. Rotospraying assists in the proper cleaning of milled enamel to insure against contamination, and to help in the production of Whirlpool washing machines.

And throughout the enameling industry hundreds of Rotosprays are on guard for the proper cleaning of milled enamel and to help in the production of the finest quality enamel finishes for washing machines, ranges, refrigerators, sinks, bathtubs — in fact for all types of enameled products.

Check your plant today and make sure that you have the correct number and correct size of Rotospray units to properly prepare your enamel slip at lowest possible cost. Then check with us or with any authorized representative.

Photo shows Rotospray in operation in the Clyde Porcelain Steel Div. of Whirlpool Corp., Clyde, Ohio.

Contact us direct or one of our authorized representatives.

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B. F. DRAKENFELD & CO., INC., New York, N.Y.
PEMCO CORPORATION, Baltimore, Md.
O. HOMMEL COMPANY,. Pittsburgh, Pa.
FERRO CORPORATION, Cleveland, Ohio and foreign offices
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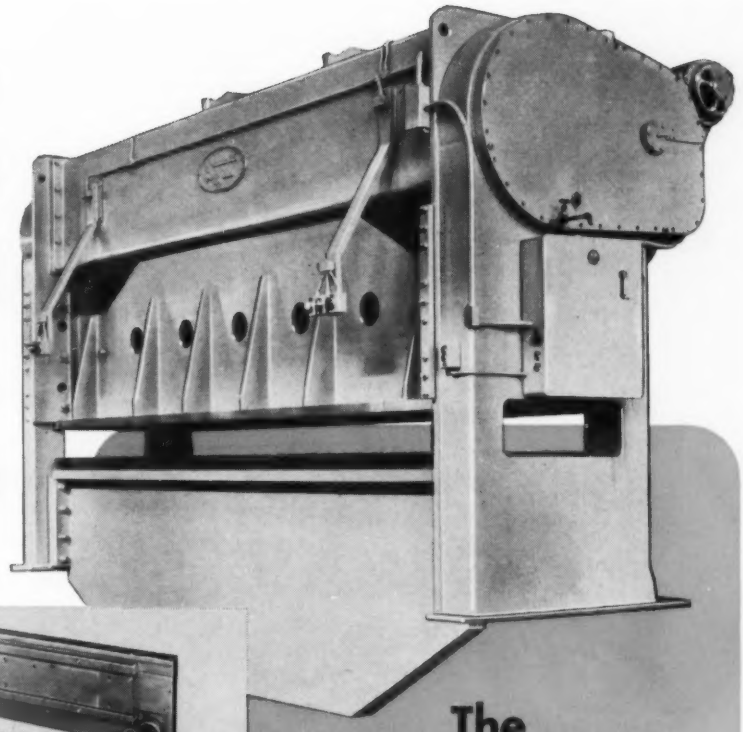

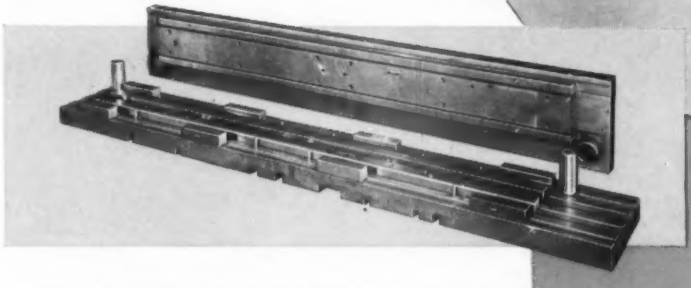

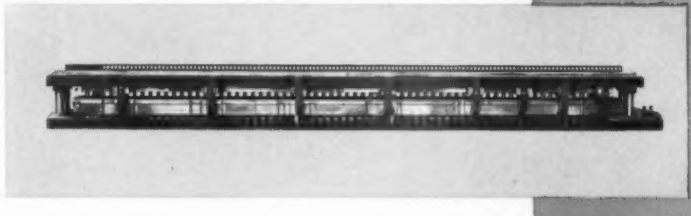

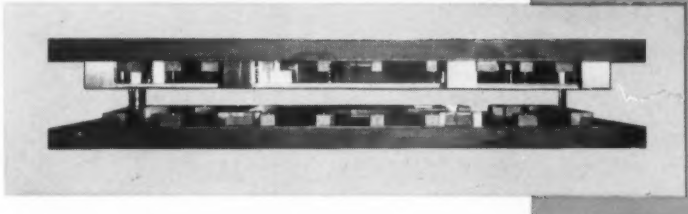

Special dies for notching, punching, embossing, flanging, etc. are furnished to specification with each machine.

The Struthers Wells PUNCHING and NOTCHING Machine

This versatile equipment permits rapid changeover of die sets used in processing steel sheets prior to roll forming, and affords maximum precision and convenience in service. With a capacity of 200 tons, the machine's bed and ram platen are 192" long x 48" wide maximum; 96" long x 36" wide minimum. Stroke is 5", with operating speed of 30 strokes per minute. Start, single stroke, continuous run and inching controls are provided. Write for full details.

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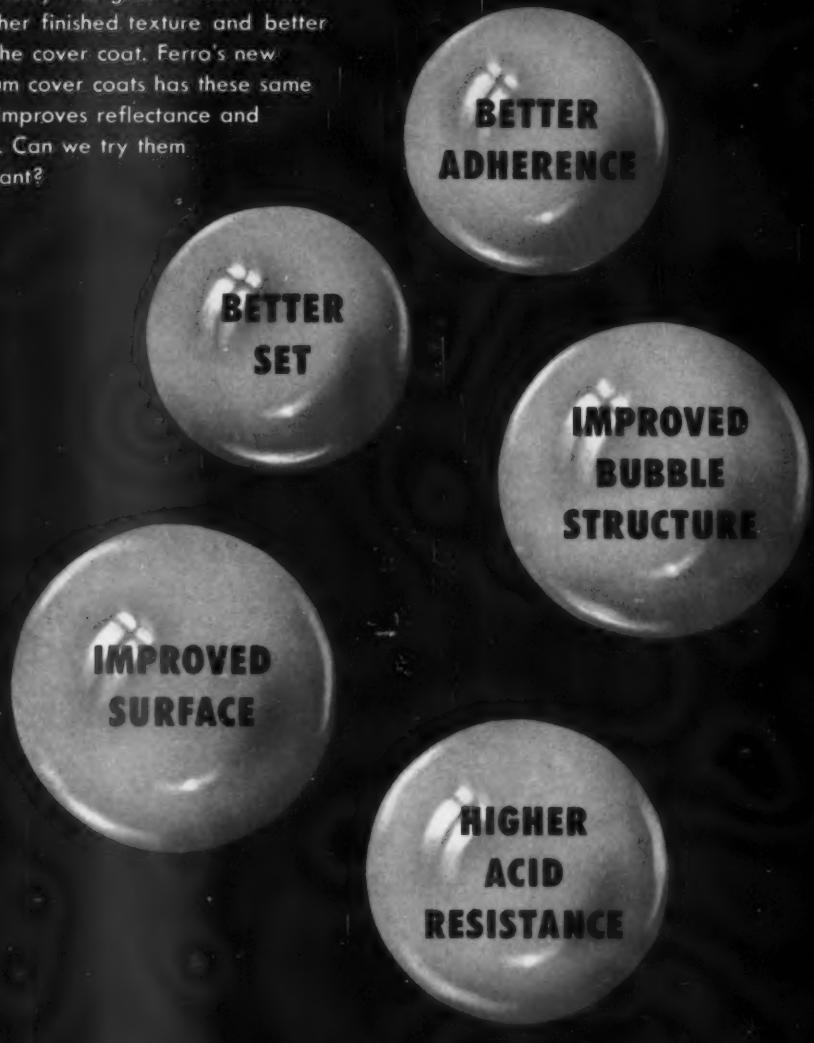
Proved Better in Five Ways!

Ferro's new "F-P" clays are proving a revelation to porcelain enamelers who have tried them. The "F-P" stands for "Ferro Processed"—as each is a *blend* of carefully selected and quality-checked ingredients.

The *two* new clays for ground coats make possible smoother finished texture and better adherence of the cover coat. Ferro's new clay for Titanium cover coats has these same qualities, also improves reflectance and acid resistance. Can we try them soon in *your* plant?



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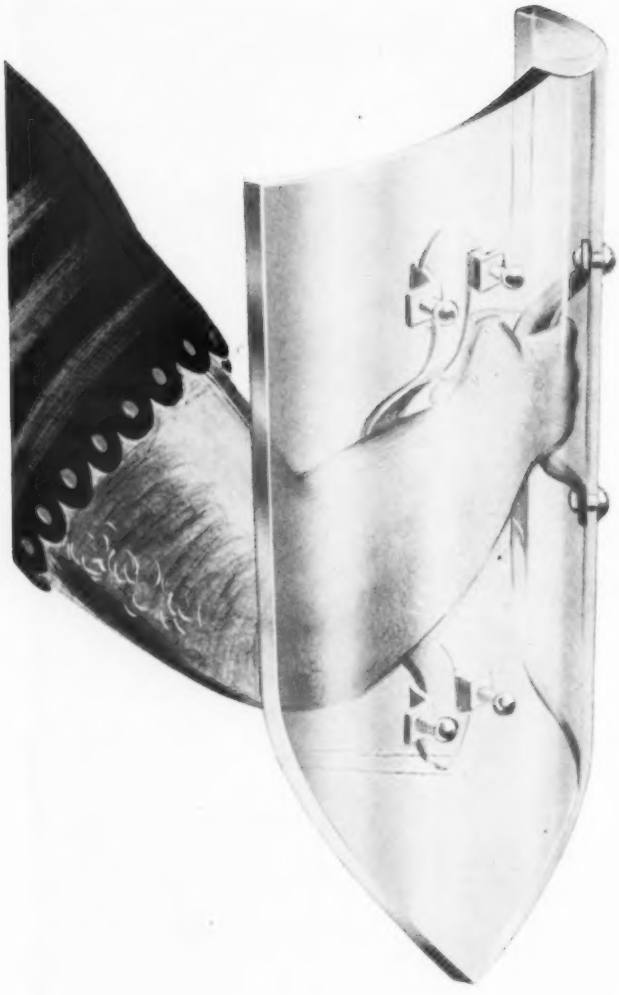

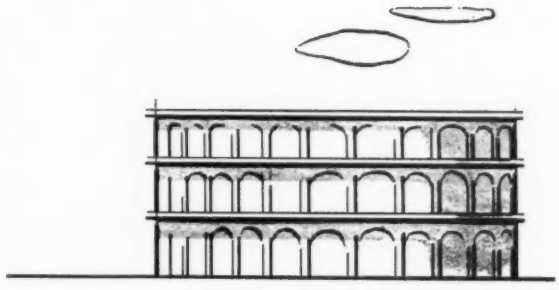

this *Glass* shield,

while symbolic,

represents some of the things a master craftsman can do with glass. It can be bowed to fit any desired shape, it can be drilled and shaped to exact tolerances.

It can be tempered to impart extreme resistance to impact — that is why safety regulations demand glass as a safety barrier when danger exists.

Let Marsco's craftsmen-engineering team impart to your product all the advantages of glass

Let glass improve the utility of your product while it beautifies it.

Marsco

MARSCO MFG. CO., 2909 S. HALSTED ST., CHICAGO 8, ILL.

THE finish spotlight

The exterior of the new Permaglas water heaters have been given a new "square" look with a flat front and sides that taper slightly outward—enabling the unit to fit harmoniously alongside or between other appliances in the kitchen-utility areas. Color is employed too—most noticeably on the front panel where an aqua hue makes it compatible with kitchen or utility room decor. Other new features include an "Eye-Hi" temperature control, and a wrap-around heating element on electric models. The Permaglas 30-gallon gas water heater has had its heat input rating boosted to 33,000 Btu/hour.

Adding light-years to a fixture's life-span

Reflectance that starts out high and stays high even after repeated washings of the NUBELITE*-finished surfaces are characteristic of Daybrite lighting fixtures.

Installation and maintenance are easier because the tough, flexible NUBELITE coating withstands rough handling. Surface contamination wipes easily from the smooth film without damage.

NUBELITE finishes are especially formulated to give all the film characteristics specified by the engineers, production managers and finishing foremen.

Glidden Technical Service can provide special NUBELITE formulations and application recommendations for any manufacturer.

THE GLIDDEN COMPANY
INDUSTRIAL FINISHES DIVISION
11005 MADISON AVENUE • CLEVELAND 2, OHIO

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THE finish LINE

THE PROBLEM OF "COLOR" — continues in the spotlight for the manufacturers of appliances and many other important fabricated metal products. The "die hards" who stated a year or two ago that they would have no part of the color trend have, in many instances, pulled in their "No-s" and started the wheels turning to join the parade.

At a year-end meeting of appliance manufacturers, a friendly (we hope) manufacturer pointed the finger at your editor and said: "There is the man who has promoted the color trend for home appliances." Interesting but hardly accurate — "reported" is the word, not "promoted".

Yes, for many months the editors of **finish** have attempted to keep the subject of color before our readers, for we were certain that, regardless of the length or depth of the trend to color, such a trend was definitely developing, just as an earlier trend developed from a start in the year 1926, and touched most of the major appliances manufacturers.

Reporting facts and opinions

Readers will remember our early "spreads" on the subject as reporting the views of the country's leading national "home publication" editors.

Then came opinions and reports from suppliers of the materials required to produce colored products. ("Could it be done"? — they said it could.)

Other reports covered expressions from the end product manufacturers — at the management, sales and factory levels.

No "bone to pick"

We have no personal or financial interest in the color "problem", as such. There is no reason for us to promote *or* discourage the development of a trend.

Accurate reporting of the facts and opinions as presented by the best authorities in design engineering, magazine editing, and some top manufacturers pointed to the fact that color was coming as sure as the next new year. The manufacturers who *chose* to ignore these earlier presentations and "fight the problem" were, we believe, emulating the ostrich.

Color is here

Now that many of the top producers of major appliances (including refrigerators, ranges, washers, dryers, water heaters, etc.) and the kitchen cabinet manufacturers have thrown their respective hats in the ring there should be no further question in any manufacturer's mind as to whether colored products *can* and *will* be produced.

Length and depth

The question that hasn't been answered, and probably won't be for some time, concerns the *importance* of the trend, production and sales-wise, and the length of the period over which it is destined to live.

Producing from 5% to 10% of total production in color presents an entirely different problem than the production of from 50% to 60% in color.

The wise manufacturer is the one who has his sales and research "scouts" following the "degree" of the color trend so that top management and production management will have the best possible field information to serve as a guide for future months.

As a reporter on "color" for the metal products field, **finish** will continue to keep its readers posted.

What about built-ins

Another parallel subject that is enjoying a sister spotlight with color is the question of the "built-in" kitchen appliance.

The race is on for supremacy in this new market. Who will win? Will the trend be to merchandising by "kitchen" manufacturers, or by the individual appliance manufacturer? These and other questions will be discussed in **finish** as the "trend" develops.

Dana Chase

EDITOR AND PUBLISHER

Census of Manufacturers — A Joint Responsibility

While the Census Bureau is charged with collecting the data required in the Censuses of Industry and Trade, a good job cannot be done without the cooperation of all businessmen who are called upon to report the facts about their businesses. The value of the censuses depends largely upon prompt and accurate reporting by business, and speedy compilation and publication of the results by the Census Bureau. Businessmen are asked to file their reports within 30 days after they receive their reporting form. The Census Bureau is dependent upon speedy and accurate reports by businessmen to enable it to carry out its program for earliest publication of the statistical information to be based on their reports. Thus the Census Bureau and American businessmen jointly share the responsibility for making available to the Nation-at-large timely statistical data on business activity.

When your census forms and schedules are received, you are asked to do these two things: 1. Make COMPLETE and ACCURATE reports. 2. Return your reports to the Bureau of the Census PROMPTLY. Then the new censuses will be of real and timely value to all businessmen.

1920 FERRO 1955

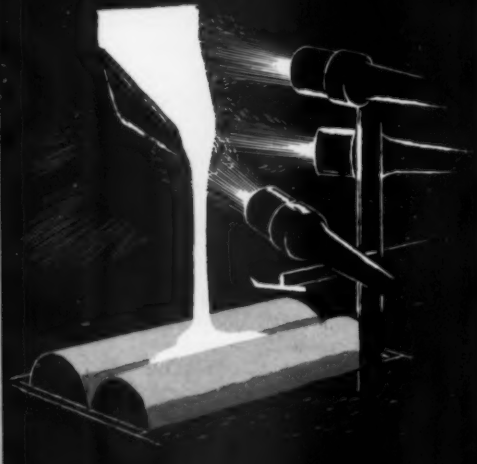
A business grown big through SERVICE

1920

Ferro starts production of high-uniformity, custom-made frits for the Porcelain enamel industry.

1955

Ferro plants in **twelve** countries are producing more than **10 million** pounds of frit monthly.



FERRO CORPORATION

cleveland · nashville · los angeles

IN CANADA: FERRO ENAMELS, LTD., OAKVILLE, ONT.

the Norge story

Gentlemen:

Thank you for the splendid job you did in putting together the Norge program in the January issue of *finish* magazine. To me this was a tremendous job well done, and you are to be congratulated on the able and expeditious manner in which you handled it.

We want you to know that we sincerely appreciated the wholehearted cooperation we received from you in preparing the Norge story. It all goes to prove the efficacy of a well-organized publication.

Virgil C. Rice
Vice President
Manufacturing & Engineering
Norge Division
Borg-Warner Corporation
Chicago, Illinois

---

keeping up with events

Gentlemen:

I have had the pleasure of receiving *finish* for several years .... Your magazine has been most helpful to us in that the advertisements and feature articles have kept us up with what is being offered and what is happening in the appliance and metal product fields. I most certainly do want to continue to receive your fine magazine.

Robert K. Laird
Engineer
American Radiator
& Standard Sanitary Corp.
Louisville, Kentucky

---

textbook on enameling

Gentlemen:

I'm in search of a little information and maybe you can help me out. I would like to know the title of the textbook on enameling that was written by A. I. Andrews, and the date it was published and by whom.

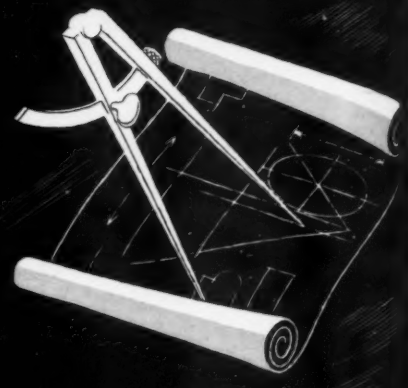
Your magazine is getting bigger and better all the time.

Edward Winter
Cleveland, Ohio

The first edition of the textbook referred to was published in 1935 by the Twin City Printing Co., Champaign, Illinois. The book is entitled "ENAMELS — the Preparation, Application, and Properties of Vitreous Enamels". — Eds.

1920 FERRO 1955

A business grown big through SERVICE

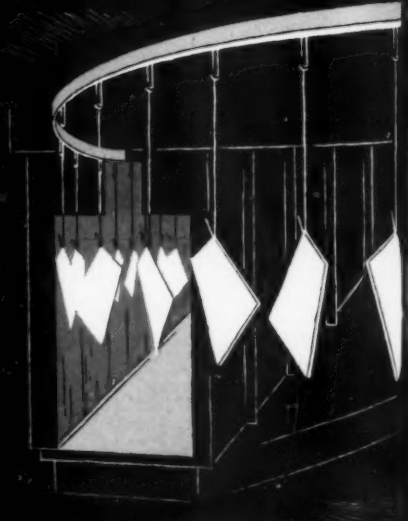


1921

Ferro organizes an Engineering Service to plan, design and build more efficient Porcelain enameling production facilities.

1955

More than 85% of all modern Porcelain enameling installation are Ferro-designed and Ferro-bu



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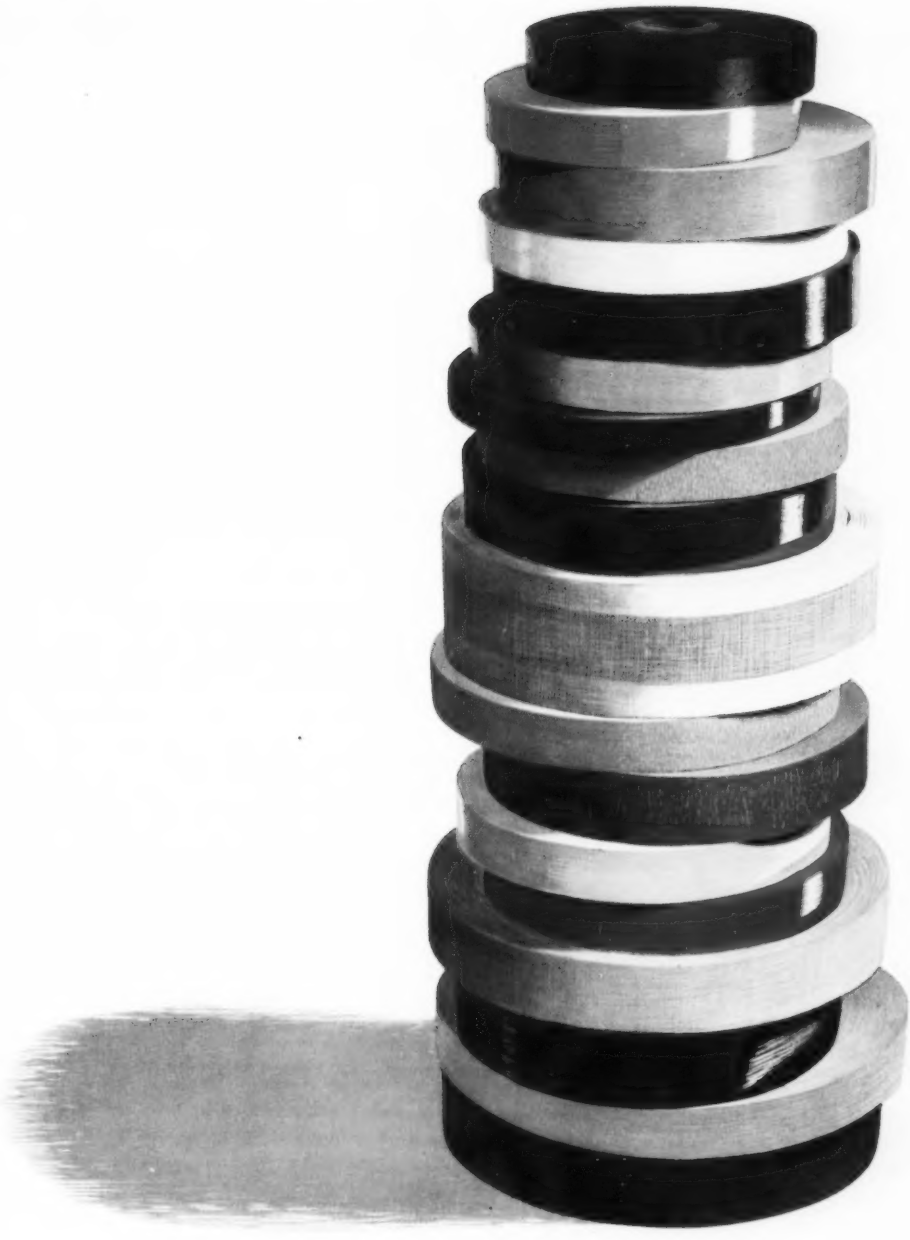


whatever the job . . .

SELF-STICKING

PERMACEL® TAPES

In our complete line, there's a self-sticking tape for every job . . . write Permacel Tape Corporation, New Brunswick, N. J.

the finest strippers of all

are in NORTHWEST drums

"Step right up Gentlemen, you ain't seen nuttin' yet."

And you haven't until you've seen Northwest's Strippers in action.

These high-speed babies really "peel" organic finishes. Built to cope with all types of paints on metals or plastics — Northwest Strippers give you a clean surface ready for repainting in one run-through.

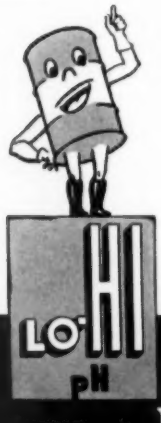
Northwest Strippers are Safe — no fire hazard, no odor, no fumes, non-toxic.

Northwest Strippers are Sure — parts are fully cleaned — metal surfaces are unharmed — long life is assured — economy is proven.

Northwest Strippers are Soluble — film is converted into a form which can be rinsed off with water spray — contains no chemicals which can't be flushed through sewers.

Call your Northwest Cleaning Specialist for the right stripper to do any job.

Remember — YOUR COST PER FINISHED ARTICLE IS THE TRUE COST OF YOUR CLEANER.

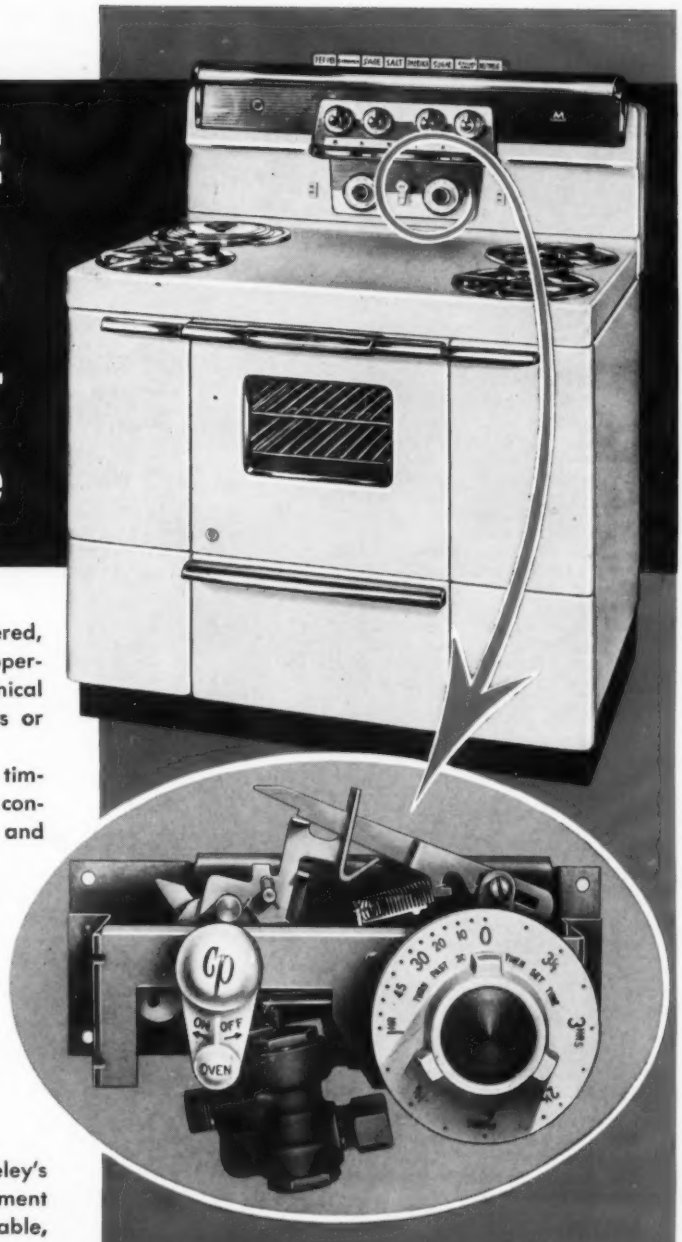


NORTHWEST CHEMICAL CO.

9310 ROSELAWN DETROIT 4, MICH.

pioneers in pH cleaning control *serving you since '32*

Consider THE RELIABLE KS TIMER for Your Home Appliance



The K-S Timer is a heavy-duty, self-powered, clock-type unit which can automatically operate either an electric switch or a mechanical linkage. It is especially applicable to gas or electric ranges and washing machines.

Lever type escapement assures accurate timing over the complete cycle. Sealed-in construction prevents entrance of moisture and foreign matter. Initial lubrication is sufficient for years of constant service.

The K-S Timer can be mounted in any position. Switches accommodate push-in terminals to facilitate quick electrical connection.

These units are available for 15, 30, 60, 120 and 240 minute time cycles, each corresponding to a complete rotation of the pointer.

Fourteen years of timer engineering and quality control in addition to King-Seeley's broad experience in automotive instrument production have made the K-S Timer a reliable, trouble-free component.

Write for Descriptive Literature and Quantity Prices

7077

K-S Timer automatically shuts gas valve and closes the damper of this Maytag Dutch Oven Range.

KING-SEELEY CORPORATION
ANN ARBOR, MICHIGAN

FOSBOND FORUM

This column carries quotes from technical papers delivered on the subject of phosphate coating; answers questions about the use of Fosbond, Pennsalt's trouble-free phosphatizing process.

FOSBOND CLEANERS AND ACTIVATORS

Pennsalt's study of cleaning prior to phosphatizing has resulted in a group of specialized cleaners. Now available with several Fosbond cleaners is another remarkable product—ACTIDIP. When incorporated into the phosphatizing cycle, Actidip refines crystal size, lowers coating weights, improves adherence of the finish to the metal. Basically Actidip is a compound containing titanium which when added to water forms a colloidal suspension. Since acquiring patent rights, Pennsalt has developed manufacturing methods that make Pennsalt Actidip® more effective than similar compounds.

WHAT DOES ACTIDIP DO?

Actidip promotes the formation of a fine, uniform phosphate coating in the subsequent phosphatizing operation, which is much duller when viewed in the light. The surface is far better prepared for the application of paint. There is little loss in gloss. Corrosion resistance is improved. Remember that Actidip cannot be used alone. It must be part of the regular Fosbond cycle.

—J. W. Carroll, Inorganic Research Dept., Pennsalt Whitemarsh Laboratory

QUESTION—

How much can Actidip lower my use of phosphatizing solution?

ANSWER—

Up to 50%. The use of Actidip in the Fosbond cycle reduces both the chemical consumption and sludge formation, and at the same time obtains a superior product.

QUESTION—

How are mandrel tests used by Pennsalt to examine the flexibility and adhesion of the paint finish over a phosphate coating?

ANSWER—

In mandrel tests, in which the steel panel is bent over a conical mandrel and given a 90 to 180° bend, untreated painted surfaces offer no resistance to flexing. Panels treated with Fosbond have a paint film with enough "play" to take the severest test designed. There is no flaking of the film from the panel. Cracking of the paint film along the bend of the panel is non-existent. Write for test panels treated with Fosbond.

Send us your questions.
For complete technical information about subjects briefed in the FOSBOND FORUM, write: Customer Service Dept., Pennsylvania Salt Mfg. Co., 1026 Widener Bldg., Phila. 8, Pa.

INDUSTRY MEETINGS

KITCHEN CABINET MEETING

Steel Kitchen Cabinet Manufacturers Association, quarterly meeting, New York City, March 9.

PEI WEST COAST MEETING

Porcelain Enamel Institute, West Coast conference, Biltmore Hotel, Los Angeles, March 10-11.

ASTE WEST COAST MEETING

American Society of Tool Engineers, annual meeting and first western industrial exposition, Shrine Auditorium and Exposition Hall, Los Angeles, March 14-18.

METAL STAMPERS SYMPOSIUM

Pressed Metal Institute, annual spring technical meeting, Hotel Carter, Cleveland, Ohio, March 16-18.

ENAMELER CLUB MEETINGS

Midwest Enamelers Club, tour of Milwaukee plants, March 25.

Central District Enamelers Club, tour of Westinghouse plant, Columbus, Ohio, May 6.

WORLD PLASTICS FAIR

World Plastics Fair & Trade Exposition, National Guard Armory, Exposition Park, Los Angeles, April 6-8.

PACKAGING EXPOSITION

American Management Association, national packaging exposition, International Amphitheatre, Chicago, April 18-21.

CERAMIC SOCIETY MEETING

American Ceramic Society, annual meeting, enamel division sessions, The Netherland Plaza, Cleveland, Ohio, April 24-28.

LP-GAS CONVENTION, EXHIBIT

Liquefied Petroleum Gas Association, annual convention and exhibition, Conrad Hilton Hotel, Chicago, May 1-4.

PEI MID-YEAR CONFERENCE

Porcelain Enamel Institute, mid-year division conference, Edgewater Beach Hotel, Chicago, May 11-13.

MATERIALS HANDLING SHOW

National Materials Handling Exposition and Conference, International Amphitheatre, Chicago, May 16-20.

APPLIANCE TECHNICAL MEETING

American Institute of Technical Engineers, annual appliance technical conference, Hollenden Hotel, Cleveland, Ohio, May 23-24.

BASIC MATERIALS EXPOSITION

Annual Basic Materials Exposition, Convention Hall, Philadelphia, May 31-June 3.

KITCHEN CABINET MFRS. MEETING

Steel Kitchen Cabinet Manufacturers, annual meeting, The Greenbrier, White Sulphur Springs, W. Va., June 2-4.

APPLIANCE INST. MEETING

Institute of Appliance Manufacturers, annual meeting and suppliers' exhibit, Netherland Plaza, Cincinnati, June 6-8.

AWS WELDING SHOW

American Welding Society, annual welding show, Municipal Auditorium, Kansas City, Mo., June 8-10.

INDUSTRIAL FINISHING SHOW

American Electroplaters' Society, annual convention and industrial finishing exposition, Public Auditorium, Cleveland, June 20-23.

Fosbond helps add buy-appeal to McCray KOLDFLO cabinets

McCray KOLDFLO cabinets for ice cream, frozen foods and meats are widely used in self-service stores and super markets from coast to coast. Superbly engineered for their basic job of holding low temperatures within, they also have to do double-duty as silent salesmen, present foods in an attractive way. Their handsome high gloss, high baked white enamel finish, *locked on* with Fosbond®, is a big factor in their famous eye-appeal.

Fosbond 61, applied to both the zinc and steel surfaces of McCray cabinets, creates an ideal base for the organic finish—making it easier to apply, and promoting a smoother coating "locked" to the underlying metal. With Fosbond, McCray has obtained excellent adherence of finish to metal, a superb quality outer finish, and top production.

In addition to the necessary Fosbond materials, Pennsalt also offers to users *continuing* technical assistance to keep operations smooth-running, trouble-free. And behind Fosbond stands Pennsalt—a major chemical producer with long experience in the metal processing field.

If your plant and product would benefit from a *better* phosphatizing process and the merchandising value of the Fosbond-Good Housekeeping emblem, you ought to know more about Fosbond. Let us make a survey of your finishing operation (takes but a few hours... no obligation). Write: Customer Service Dept., Pennsylvania Salt Manufacturing Co., 1026 Widener Bldg., Phila. 7, Pa.

FOSBOND

Pennsalt Chemicals

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CHRYSLER AIRTEMP engineers, leaders of long standing in the air conditioning field, are highly pleased with the performance of the special finishes developed by Pittsburgh for their products. Experience has proved that these quick-drying primers and durable decorative coatings meet fully their most exacting requirements on home and commercial cooling equipment.

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Pittsburgh provides every kind of finish for this highly specialized field —special coatings for interior sections, drip pans and plenum panels where moisture resistance is the chief consideration; extra tough materials to protect motors and compressors; and unusually durable finishes for units with outside projection. You can also choose from several types of finishing materials —smooth enamels and hammered or wrinkle effects that can be made to fit any baking cycle.

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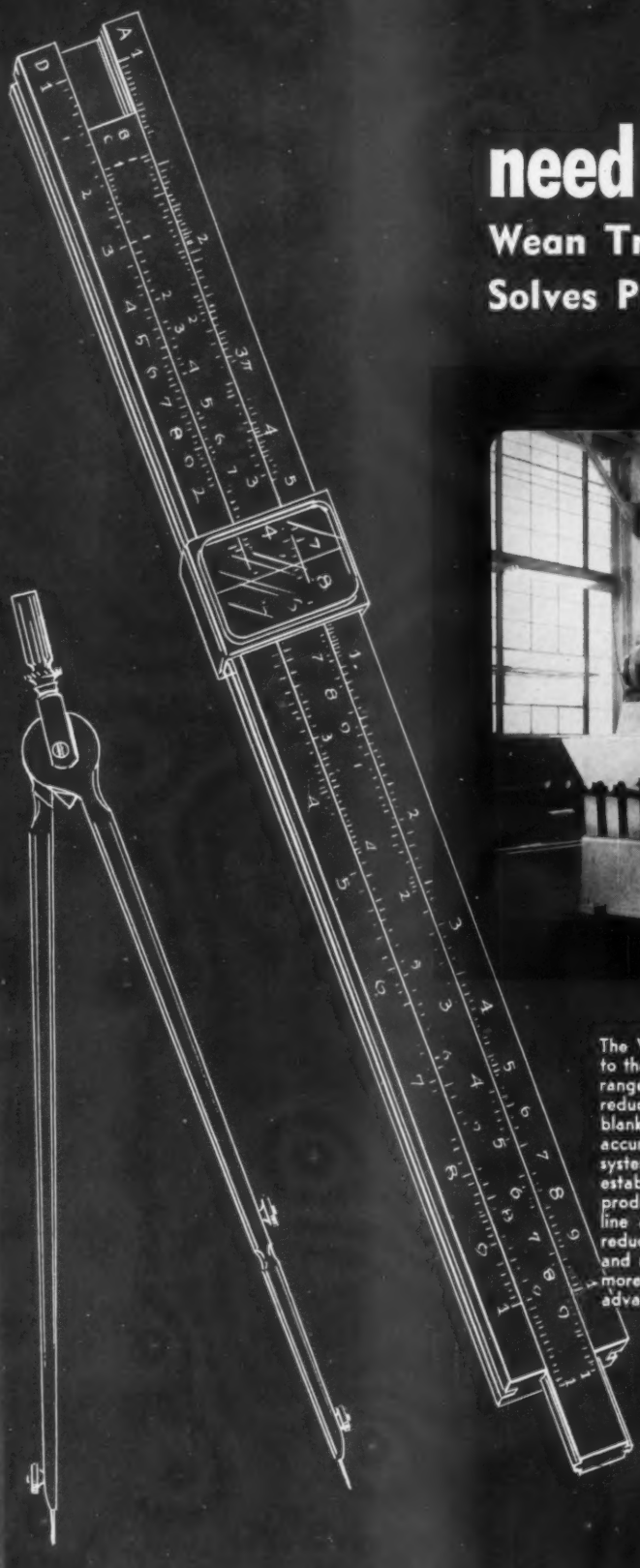
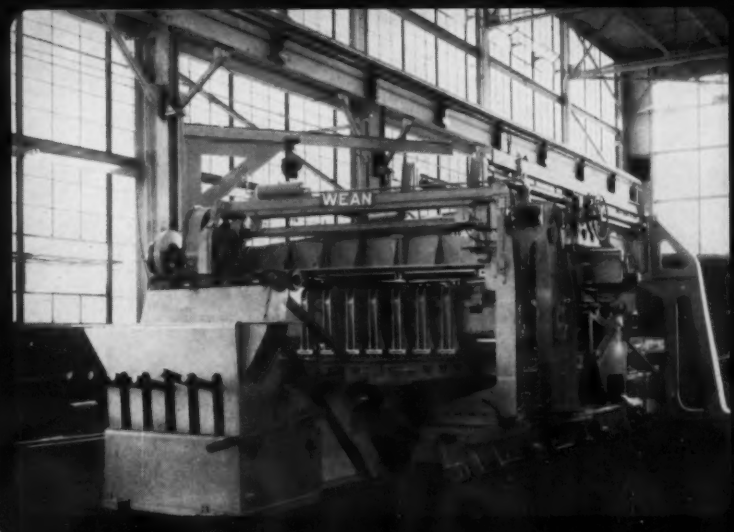
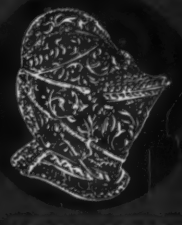


need an idea?

Wean Trapezoidal Shear Line Solves Problem for Auto Maker



The Wean Trapezoidal Shear Line was developed as an answer to the high speed blanking of irregularly shaped pieces in the broad range that can be described as trapezoids or parallelograms. This use reduces tremendously the cost of expensive die setup in major blanking presses. Two pieces are made at each index with the accuracy that can only be achieved by a measured length indexing system. The cut can range from 45° to 90° angles. The latter setting establishes the line as a straight cut-up unit with twice the normal production of conventional shear lines. At Wean, we consider this line as another important step forward in our policy of cost reduction through progressive engineering. People in the automotive and metal fabricating fields have come to look more and more toward Wean Equipment for spectacular advances in machinery for metal processing.



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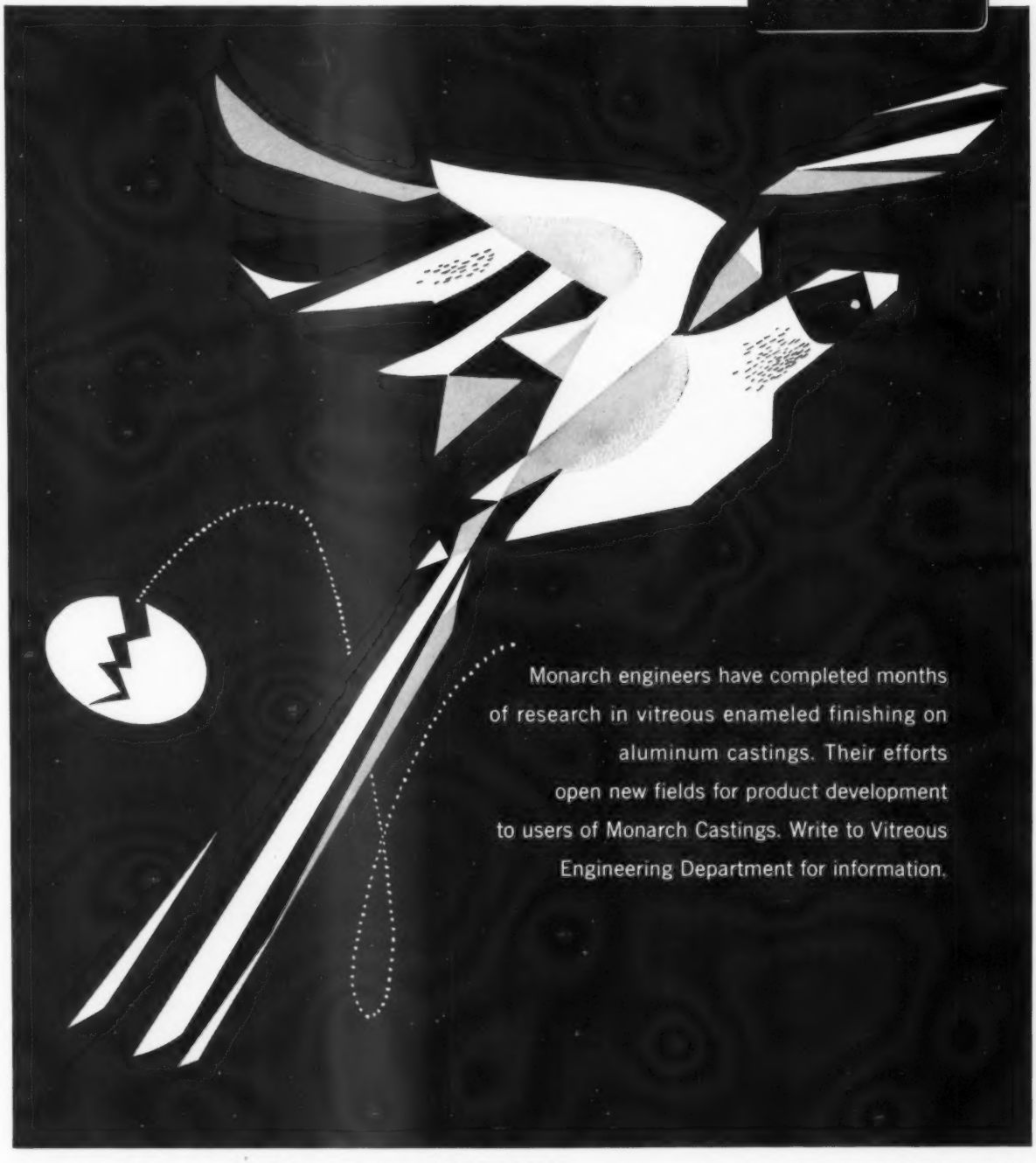
Monarch engineers have completed months of research in vitreous enameled finishing on aluminum castings. Their efforts open new fields for product development to users of Monarch Castings. Write to Vitreous Engineering Department for information.

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Designing tomorrow's appliances

including photos of Frigidaire's experimental "kitchen of tomorrow" which is touring the country with General Motor's 1955 Motorama

by Leroy E. Kiefer • CHIEF PRODUCT DESIGNER, STYLING SECTION, GENERAL MOTORS CORP., DETROIT, MICHIGAN.

SINCE 1935 I have been looking into the future in the field of design in one category or another, and I think it is even more exciting today than it was then. New avenues of mechanical, electrical, chemical, physical and a host of other related development have given the creative person opportunities he scarcely dared dream of ten short years ago. No doubt the war stimulated this type of research but, whatever the reason, we are all benefitting from it and we should be properly grateful. In recent years we have all been even more skeptically critical of the established and time honored way of doing things, and, as a result of this, are rapidly finding new and better ways of doing almost everything, be it cooking turkeys or painting baby buggies.

Shown above is Frigidaire's "Kitchen of Tomorrow." Glass panels in the kitchen can be pushed aside opening patio (foreground) to kitchen. Appliances, such as oven and range surface units, can then be used and controlled from either inside or outside, and there is a refrigerated bar built into the exterior wall of the home for patio use.

The architectural influence

My early training was in architecture and I feel that I could have no better background for the work we are now doing. Appliances inevitably bear a relationship to the architecture of the home and are influenced by it. Architects for years have been working for closer ties between

themselves and the appliance manufacturers.

It has been their duty to coordinate the many and varied elements which go to make a home into one harmonious whole. The thoughts and suggestions of this large and highly skilled group of people should certainly be given very serious attention. Their requests for flush doors, concealed mechanisms, built-in units, functionally designed products and a host of other allied demands are all aimed at the same ideal: how to make our surroundings a nicer, more pleasurable place in which to live.

I think in simple words this last statement is the motivating force behind the daily efforts of every designer worthy of the name. May I repeat: how can we make our surroundings a nicer, more pleasurable place in which to live.

Three areas of appliance design

The designing of tomorrow's appliances breaks down into three fundamental but unrelated areas. The *first* is the group of people who have devoted their lifetime to the study of design and who are spending most of their waking hours designing for the future. *Second*, the factors both economic and cultural which influence it, and *third*, the means by which it is accomplished.

Editor's Note:

Mr. Kiefer's group of 75 designers represents one segment of the design group in General Motors. His group deals with appliances, exhibits and architectural projects; a larger group deals with automobiles. While the author's comments are related to home appliances, they are designed to be applied to the general commercial field as well.

During my past 20 years at the Styling Section, I have worked on and watched other designers study a tremendously wide list of products whose scope has varied from the smallest of electrical bayonet plugs to the largest of locomotives. I have watched them take the greatest of pains with a name plate for a fractional horsepower motor or a new transportation system for a great foreign nation, and it is always a thrill to see things develop from the mind and hands of an able designer.

Many times I have come across people who think that designers are a special "breed of cat" who have the ability to see a little deeper into that crystal ball and are, therefore, able to come forth with new imaginative ideas which are not visible to others. It is true that inspiration does play a large part in our work but that inspiration is born of a background of training and experience which often extends back to childhood.

Today's designer has, with his heritage of past experience, trained himself to imagine what the products of the future will be. Ask him how the range of 1965 may look he will give you five possibilities, and while you are looking at them, he will sketch you six more. He lives with tomorrow in comfort for he is always

: Arrayed along a 12-foot wall are four sepa- refrigerated appliances. The counter-top at the extreme left is a beverage cooler. The ight white appliance (center left) dispenses a ice of ice cubes, crushed ice, or cool water. t, with both doors open, is a combination freezer-refrigerator. The refrigerator occu- the top half, freezer the lower half, and indi- ally operated doors slide open and closed ically at the touch of a finger. At extreme t is a moist-cold refrigerator that rolls out a large file drawer. It maintains proper tem- ture and humidity for storage of fruits, vege- tables, eggs, butter, cheese and meats.

---

w right: The homemaker takes over as home ager at this planning desk in Frigidaire's "Kitchen of Tomorrow." The desk is com- with intercommunication facilities, a tele- n screen that permits her to watch what is g on elsewhere in the home, and a telephone can answer without even touching the instru- t. The TV set, which also receives normal nels, swivels by remote control to face any t of the room. The telephone is an automatic- ering, "hands free" unit developed by the System and modified and styled by General rs for use in this kitchen. This experimental hen was shown publicly for the first time n the GM Motorama started on its tour of the country early this year.

dissatisfied with today. He is continually examining today's products in the light of what he thinks they ought to be. Though he is no engineer, he may try food storage in a carbon dioxide atmosphere where no cold is used because he has heard that bacteria cannot live without oxygen. He may try cooking with infrared or washing ultra-sonically because these things open new avenues of thinking. He is an arch enemy of the "status quo".

He gets himself so steeped in the background of a field of design that he is no longer hampered by its limitations. This is a very important point, for a designer is not really free of the limitations of the past unless they have become part of his nature. He must get to the point where he does the right thing by instinct. Because a product has always been made a certain way in the past he does not take it for granted that the same will hold true in the future. Constant effort to find new ways of doing things and search for the materials with which to do it become part of his daily routine.

Without this constant questioning attitude coupled with the ability to carry forward from it, the product designer of today would become only the worker of a puzzle who was searching for endless new ways to put together the same old pieces.

Five factors in designing for tomorrow

So much for the people who do it. I shall discuss the second area, the various factors which must be considered when starting the design of tomorrow's product. They are five in number.

1. *The past or traditional way of doing things* — Food for instance was first cooked over an open fire (the backyard grille enthusiasts still do it today), then in a fireplace, on a wood stove, or on an electrically heated element which is a part of a porcelain coated box and so on. People who are status quo adherents always feel that the present methods are good enough, but tomorrow's appliances are going to be used in tomorrow's world and must be in tune with it. We must learn from the past but we must use this knowledge as a tool in our future work.

2. *A survey of the likes and dislikes of today's users of the product* — This survey must reflect the opinion of the marketing group as well as the user group, and here great care must be taken to make sure that the questions are phrased so as to get true answers and not the directed type. We have found that proper use of the product questionnaire will develop an amazing set of "do's" and "don't's" but it is the job of a special group of experts to ask the questions and get adequate answers. These answers must be tabulated, analyzed, weighed in relation to the answeree's knowledge of the question, if it is in a new field, before they can be used in confidence.

3. *The developing pattern of today's living* — Many factors enter here. Such things as the architectural development of houses toward the open plan where the kitchen often opens directly or indirectly into the living room or dining room, are likely to create a different demand. This particular tendency has been developing for some time in various parts of the country. It is gaining momentum and certainly is a new force to be taken into serious consideration. Basements are being

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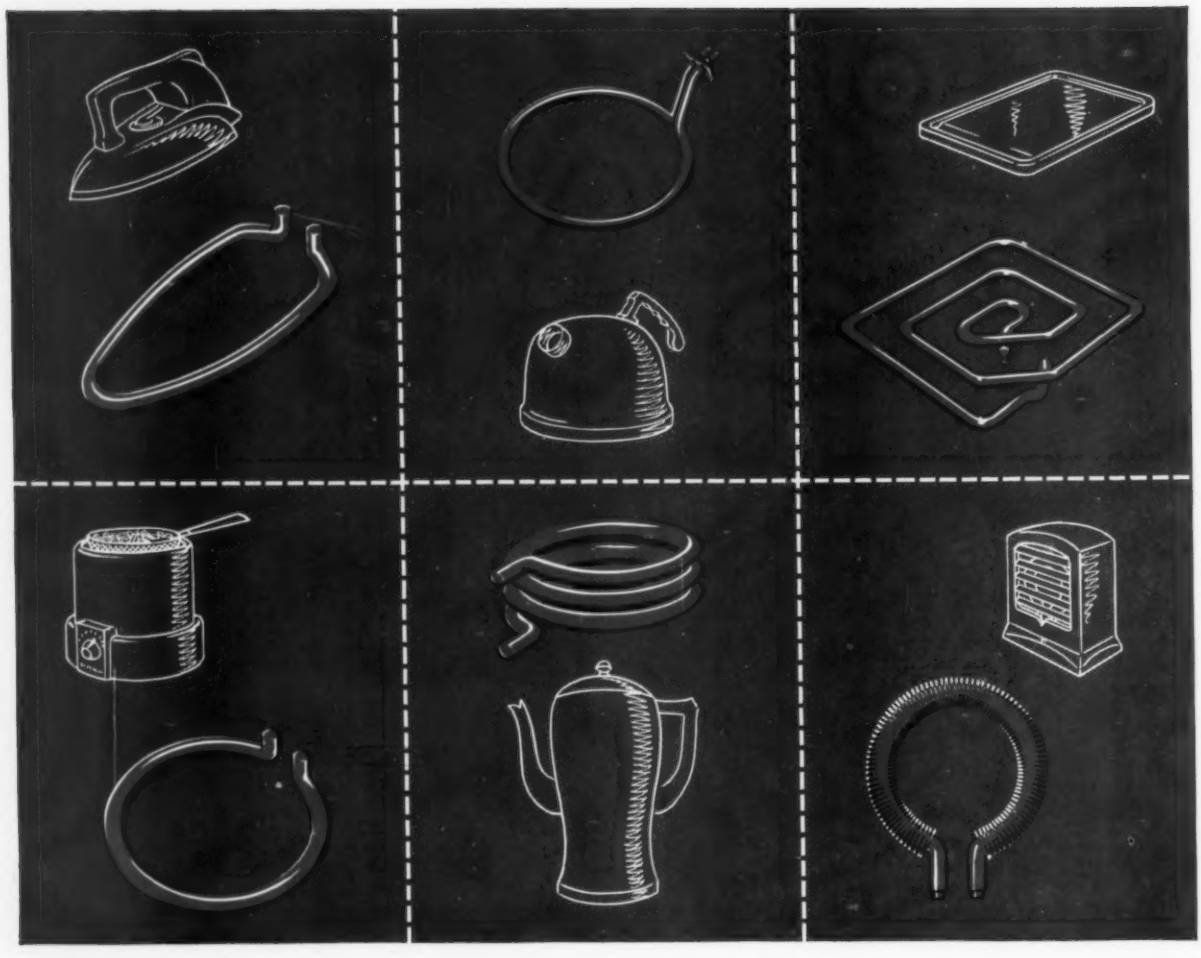

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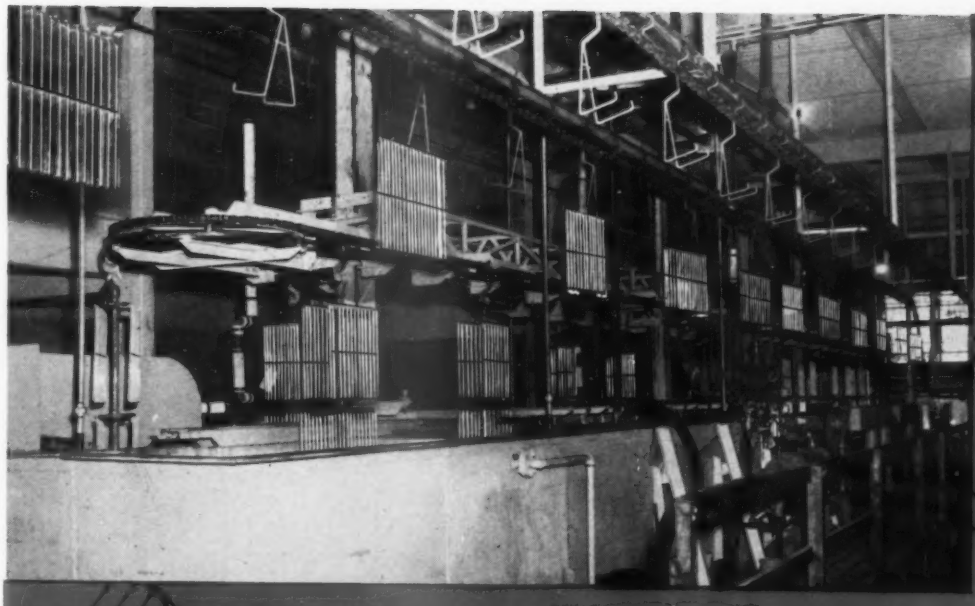

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One of four compressor stations used to provide 3600 cu. ft. of air a minute at 100 lbs. psi pressure.

Compressed air power

a comprehensive plant survey discloses economic factors well worth considering

Left: One of the test carts used to check and test all air-operated tools and air lines each week.

Right: Typical pneumatic tool operation is the wire brushing of excess weld metal from stainless steel exhaust system.

BENEFITS of $20,000 a month can accrue from a new compressed air program launched at Ryan Aeronautical Company, San Diego, California. Developed from an extensive survey, the new program outlines the method for obtaining maximum efficiency from air-operated tools with minimum maintenance. Tests show that these substantial savings may be realized from increased production and reduced operating costs.

Because it is a silent, unseen source of power, compressed air is too often taken for granted. Yet it is a potent production force which deserves expert analysis. In this instance 680 horsepower is required to obtain the compressed air used by air-powered tools. These include 4,000 hand-operated drilling, riveting and grinding tools as well as 95 resistance welding machines, huge air hammers and pressure test stations.

Economically, too, the use of compressed air involves substantial amounts. More than $2,000,000 a year in wages is paid by Ryan to just those employees using air-operated tools. In addition, an amount of $82,600 yearly is expended for parts and labor required to keep $300,000 worth of air hand tools in good operating condition.

Because of this growing importance, it was deemed advisable to undertake a detailed analysis of compressed air operations. Started several months ago by the methods engineering department, this study has been completed, and the recommendations made are now being carried out.

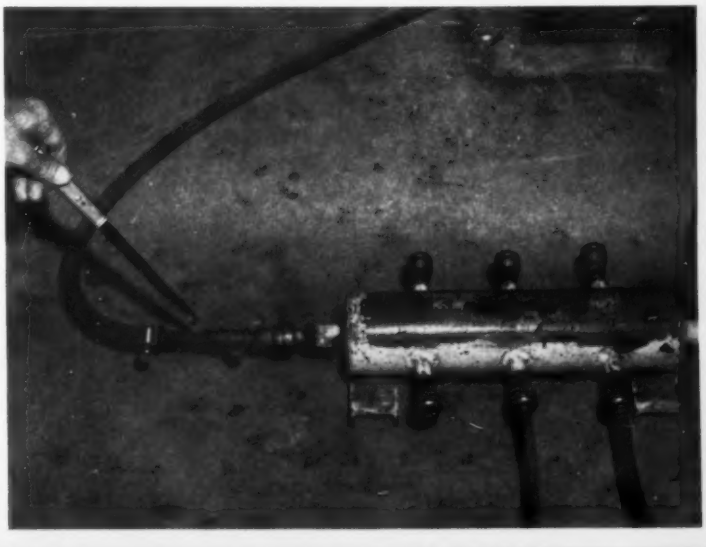
Under the direction of methods engineer John Roush this survey disclosed some interesting things with respect to the tools, distribution lines and sources employed in the compressed air activity.

TOOLS

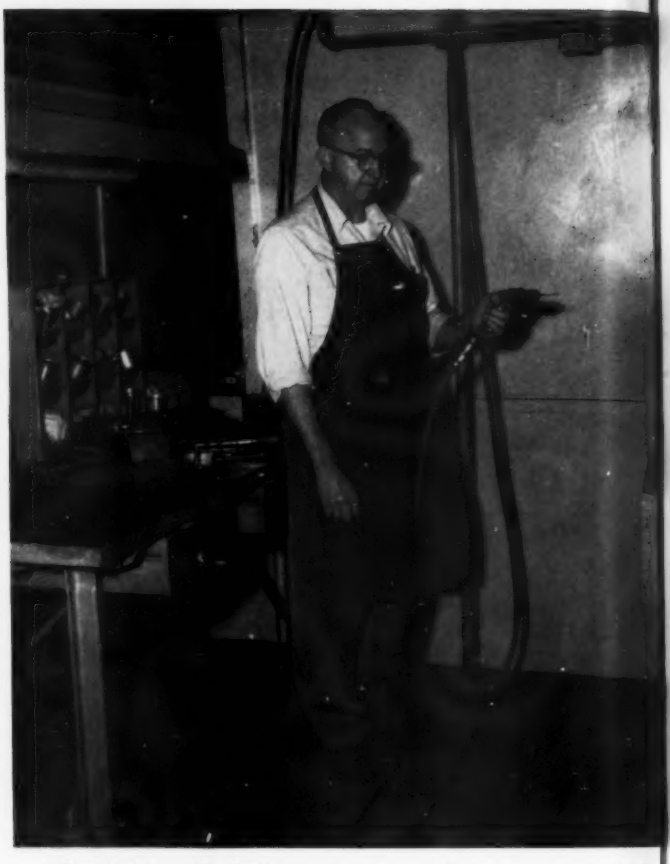
The pneumatic hand tool is a precision instrument which has a long

Damage which can occur to a pneumatic tool, through lack of lubrication, is shown in this picture. As the lubricant disappeared, the small parts and the gears began to wear excessively. The rotor splines were badly twisted by the time the gears failed.

This situation can occur in any plant unless systematic checks are made to catch the undesirable changes. A methods engineer points to a ¼-inch air line which unduly restricts power supplied to six pneumatic tools from this Ryan "pig." Also, the drain cock, extreme right, has been replaced by a plug, preventing draining of the component.



The wrong method: *In this work station, an unnecessarily long air hose has to be coiled. Both hose length and coiling reduce air power. In addition, the hose is taken from the bottom of the feed pipe, thus developing a water trap.*



The right method: *The operator now has a more powerful pneumatic drill because methods engineers have reduced the length of the air hose serving it. The hose is now taken from the top side of the feed pipe.*

life if properly cared for. In most tools, such as drills and grinders, the only parts which should wear under proper use are the rotor blades. However, it is mandatory that the tools be regularly lubricated. When lubrication ceases, tool damage begins. One damaged or worn part soon affects others, and expensive gears and bearings become involved. The cost of rehabilitating a tool which has broken down because of defective lubrication may well run between $50 and $75.

It was shown by the survey that expensive tool repairs could be avoided in almost every instance if a system were adopted which insured the regular lubrication and testing of each tool. Testing is important, because frequently a tool will become faulty, but its defection will not be apparent to the user. Consequently, he will continue to use it, causing further wear or damage and resulting in loss of production time, because the tool is not producing at its rated capacity.

In order to accomplish the lubrication and testing of tools without discommoding production, an ingenious mobile test cart was devised. Equipped with test instruments and oiling devices, these carts travel through the factory to bring the analytical facilities to the tools in use.

Every air-operated tool is tested each week. First, the tool is checked on the test cart's tachometer to determine its RPM. Then, a flow meter check is made to analyze its capacity to handle cubic feet of air per minute. By harnessing the tool to a hydraulic pump which pumps oil against a pressure gauge, a good idea of power which the tool develops is obtained. Finally, the tool is oiled. If defects show up in the tests, the tool is sent to the repair station for repairs.

In conjunction with the development laboratory a special test is being conducted to determine if molybdenum disulphide can be used as a tool lubricant. If this compound stands up as well as preliminary tests indicate, it will be possible to clean and re-lubricate the tools without dissembling them. With the standard greases now used in tool bearings and gears, this cannot be done, because the cleaning solvent washes the lubricant away. The tool then has to be taken apart and regreased. If molybdenum disulphide proves to be entirely satisfactory as a tool lubricant, the tools may be serviced completely at the test cart with dissembly, because this lubricant is not dissolved by cleaning solvents.

DISTRIBUTING LINES

Ryan factory buildings, covering over 750,000 square feet of space, are adequately served with compressed air. The desired objective is to see that a full 90 pounds per square inch pressure is brought to each hand tool. Tool manufacturers have standardized their equipment on this air pressure. They state that a tool will lose power if air pressure drops below 80 psi, and that undue wear will

to Page 64 →

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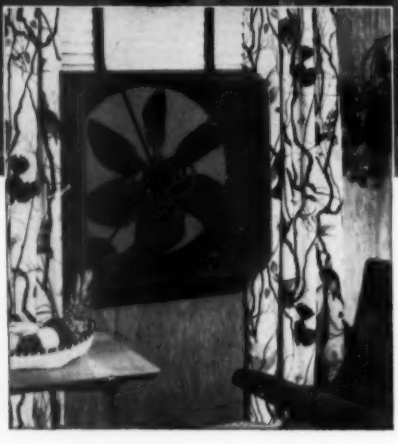
REPRESENTATIVES IN PRINCIPAL CITIES



Modern water-wash spray booths are used in applying Sherwin-Williams Fan Enamel to Reed fan cases.

"LIVING ROOM" BEAUTY for WINDOW FANS

with modern Sherwin-Williams baked finish

Many homes, for many years, have found cooling comfort with window fans produced by Reed Unit-Fans, Inc., New Orleans. Important among the sales features which have won Reed Fans a place of prominence in homes, large and small, is their luxurious, Sherwin-Williams baked-enamel finish.

Reed Unit-Fans take pride in their finish . . . feature it with identifying tags supplied by Sherwin-Williams. It's another example of the double-barreled sales help Sherwin-Williams offers . . . with finishes to fit the application, backed by the sales support of the best-known name in finishes.

Why not find out what this help can offer you in meeting production or selling problems? Call, wire or write. The Sherwin-Williams Co., General Industrial Division, Cleveland 1, Ohio.

SHERWIN-WILLIAMS

INDUSTRIAL FINISHES

Heating, ventilating engineers meet

elect Haines president of American Society of Heating and Air-Conditioning Engineers

OVER 2,500 members of the American Society of Heating and Air-Conditioning Engineers attended the 61st Annual Meeting in Philadelphia January 24-27, at which time John E. Haines succeeded L. N. Hunter as president of the Society.

Other officers installed with *president* John E. Haines, who is vice president of Minneapolis-Honeywell Regulator Co., Minneapolis, are: *1st vice president,* John W. James, vice president, McDonnell & Miller, Inc., Chicago; *2nd vice president,* Peter B. Gordon, vice president, Wolff & Munier, Inc., New York; *treasurer,* Elmer R. Queer, director and professor of engineering research, Pennsylvania State University, State College, Pa.

Retiring president L. N. Hunter, is vice president of National Radiator Co., Johnstown, Pa.

Technical sessions

Thirteen technical papers were presented during four technical sessions, presented on such subjects as dust particle measurement, panel heating and cooling, and other subjects of interest.

Testing panel-type air cleaners

Passing a synthetic test dust through an air cleaner does not give as effective a test as when using real dust under actual working conditions according to the authors of the paper, "Evaluation of Panel-Type Air Cleaners by Means of Atmospheric Dust." The authors, H. A. Endres, W. T. Van Orman and R. P. Carter, who are in the The Goodyear Tire and Rubber Co. research division, described a method of testing based on the reduction in soiling or smudging capacity resulting from the air cleaning operation. They believe that the synthetic dusts used or advocated are not representative of the type of dust found in a normal city atmosphere, and feel that as most of the air is recirculated in air heating and conditioning systems the panel-type air cleaners used should be evaluated under these conditions.

Effects of weather on cooling units

A report on the installation of a summer cooling unit in a residential structure at the University of Illinois, prepared by H. T. Gilkey, W. S. Stoecker and S. Konzo and titled Effects of Weather Conditions on Cooling Unit Operation in a Residence, presented a record of the changes which took place when the unit was operated constantly and intermittently. It was found that more moisture is removed at the intermittent speed, and that by increasing the amount of air through use of a faster speed no change was effected. This study also shows that the load on the installation seemed related to the amount of time the outside temperature exceeded 65°F.

J. E. HAINES, ASHAE PRESIDENT

Liquid-to-liquid heat transfer in hot water heaters

Describing the study of liquid-to-liquid transfer of heat in a paper titled "A Theoretical and Experimental Study of Liquid-to-Liquid Heat Transfer in Hot Water Heaters," by F. W. Hutchinson, L. J. La Tart and N. W. Smith, tell of their laboratory equipment set-up for measuring the amount of heat which passes through a water heater when the water is moving fast on the inside and slowly on the outside. The data obtained through this experiment will be helpful in predicting the amount of surface needed on hot water heaters used for this purpose.

Heat removal by cooled ceiling panel

Heat removal from a room by a cooled ceiling panel, and the temperature distribution in the cooled room were discussed in the paper, "Preliminary Studies of Heat Removal by a Cooled Ceiling Panel," which is the result of research carried on by the Society at its Cleveland Research Laboratory. Written by L. F. Schutrum, John Vouris and T. C. Min, the paper reports on experimental observations made in the laboratory under steady-state conditions to prove that the heat transfer in a room cooled by a ceiling panel is comparable to that in a room heated by a floor panel.

Successful exposition

The 12th International Heating, Ventilating and Air Conditioning Exposition, held under the auspices of the ASHAE, took place at the same time as the annual meeting and was held in Philadelphia's Commercial Museum with an attendance in excess of 30,000.

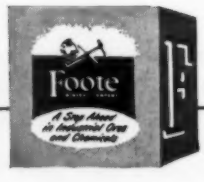
Your Best Start...

for a Better Finish

Foote LITHIUM HYDROXIDE

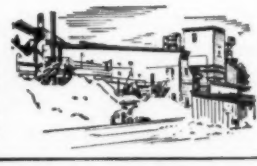
When you use a single all-purpose porcelain enamel containing Foote lithium hydroxide, you are sure of a high quality, acid resistant finish for all cast iron ware. Combining the acid resistance of former viscous enamels with the workability of Regular enamels, these new lithium all-purpose compositions mean higher quality finish at lower production costs per unit.

Now is the time to cast your plans in terms of an assured supply of Foote lithium. Write today for information about the supply and advantages of unique lithium compounds for your ceramic products.



LITHIUM HYDROXIDE
FOR INDUSTRY

Kings Mountain, N.C.... where Foote is mining large deposits of spodumene.



Sunbright, Va. ... the world's largest lithium chemical plant.

FOOTE MINERAL COMPANY
412 Eighteen West Chelten Building, Philadelphia 44, Pa.
RESEARCH LABORATORIES: Berwyn, Pa. • PLANTS: Exton, Pa.; Kings Mountain, N.C.; Sunbright, Va.

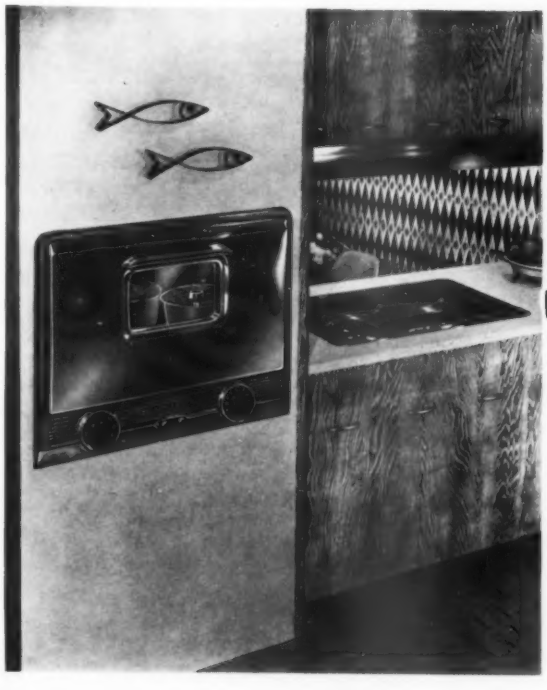
it's as easy as this...

FOR
WESTINGHOUSE

PERMA-VIEW

the window you can see through always!

"out of our carton— into your door"



Yes sir, it's as easy as this. The PERMA-VIEW oven door window comes to you ready for immediate installation in your range — to add a sales feature second to none.

The strong steel encased, double pane PERMA-VIEW window incorporates the finest quality heat resisting glass. It is mechanically sealed to prevent infiltration of vapors and to eliminate "fogging." This "non-fog" window meets the constantly growing demand for "visible baking."

More and more range manufacturers are turning to PERMA-VIEW as a practical, economical and effective sales feature for their new models. We will gladly work with your engineering department in adapting its use to your range. Write or phone for complete information.

Phone MArket 4-2256

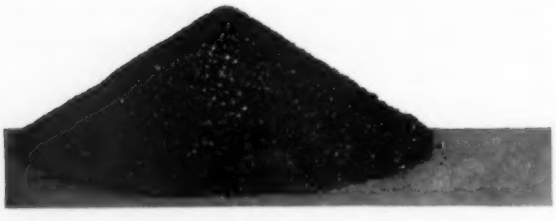
The new WESTINGHOUSE built-in oven is 24 inches wide and is equipped with a PERMA-VIEW window. The PERMA-VIEW window plus a light inside the oven make it possible for the user to see inside without opening the door.

MILLS PRODUCTS, INCORPORATED

1015 W. MAPLE ROAD • WALLED LAKE, MICHIGAN

Try Century Vit

GROUND COAT



"Start right from the Steel out" is more than a slogan — it represents a policy and belief at Century that without an easy-working, trouble-free ground coat with good adherence or "Grip" no finish can give trouble-free service for the life of the product.

The millions of pounds of Century ground coat frit that are used every year by our customers give extra assurance of trouble-free finishes, both in the shop and on the finished product.

Century *time-proved* frits "put dollars in your pockets" too. They are priced right to start and there are "in plant" savings that count up fast.

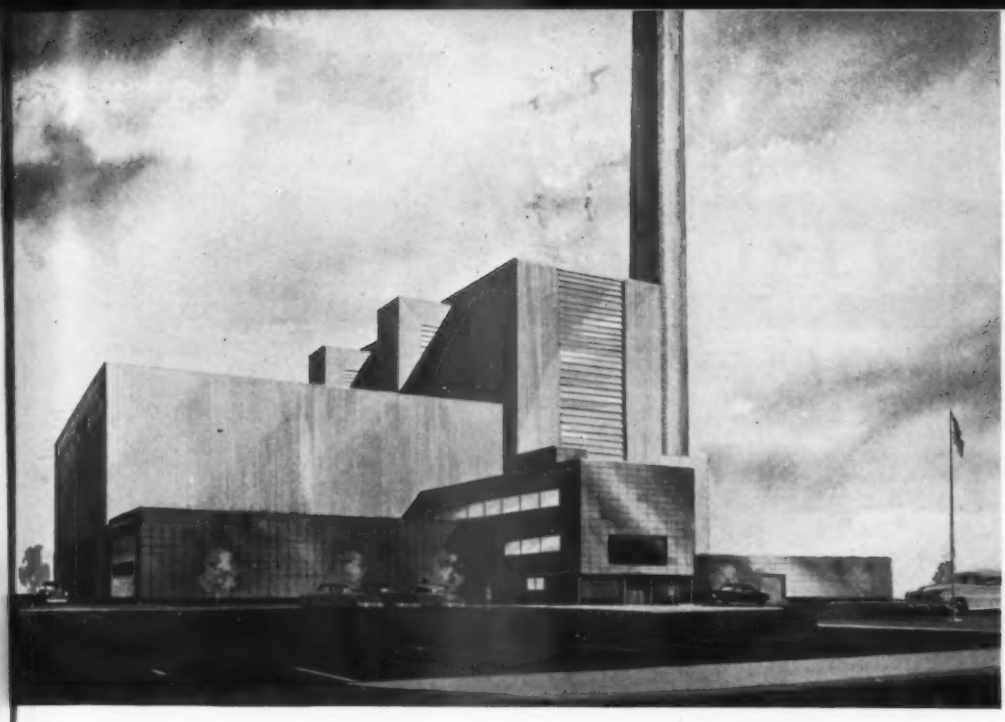
If you haven't tried this economical, trouble-free enamel, contact us and we'll see that you have the opportunity.

An experienced field staff serves the plants of all Century customers. Phone POrtsmouth 7-7260.

FRIT from CENTURY FRIT MASTERS

CENTURY VITREOUS ENAMEL COMPANY

• 6641-61 S. Narragansett Ave., Chicago 38, Ill. •



Left: Architect's drawing of the PG&E Morro Bay steam plant. Lower sections are in blending tones of porcelain enameled steel. Upper sections are faced with fluted aluminum.

Below: Close-up view of installation of fluted aluminum siding.

Industrial buildings go modern

west coast utility combines use of aluminum and porcelain enameled steel for exterior of a $44,000,000 project

by Elsa Gidlow

PACIFIC Gas & Electric Co., one of the largest utilities in the United States, is paying more attention to the exterior appearance of its new buildings. The latest, a $44 million project known as the Morro Bay Steam Plant constructed for the company near famous Morro Bay in California, is designed to be one of the most architecturally attractive plants in the PG&E system.

Norman R. Sutherland, vice president and general manager, says that his company's increasing attention to the integration of finish and design marks a trend.

The Morro Bay steam generating plant has a modern exterior "in keeping with the plant's up-to-the-minute operational design". Fluted aluminum and porcelain enamel are featured in broad panels on the main building. Facades of the office building, warehouse and machine shop join the main building on its northerly side. These are in three blending tones of porcelain enamel. The porcelain enamel is on 18 gauge steel. The porcelain sheets are 4′6″ x 3′6″, and cover the walls of the entire lower story of the machine shop, office building and warehouse. The fluted aluminum is used above.

There were several reasons for the choice of materials. The company wanted a surface that would be easy to maintain and keep clean. Proximity to the ocean called for a finish that would be resistant *to Page 58* →

EPON® RESIN does it!

a tougher, more corrosion-resistant primer for metal lawn furniture . . . *at lower cost*

New Epon primer, formulated by The Glidden Company, Cleveland, is the key to a better finish on metal lawn furniture.

HERE'S HOW...

EXPOSED to blistering sunlight, rain, and often to corrosive salt sea breezes—lawn furniture must have a tough, corrosion-resistant finish.

For this reason, the Troy Sunshade Company has set high standards of durability and appearance for finishes on its quality metal lawn furniture. When metal shortages made it necessary to abandon chrome plating, Troy engineers made a careful study of paints and paint-finishing methods. Tests showed that the *primer* coat was the key to paint durability . . . *and that an Epon resin-based primer gave improved appearance and the highest degree of resistance to corrosion.*

The Epon resin-based primer is applied by rotary spray coating. The finish coat is applied by electrostatic spraying. Both operations are completely conveyorized. Thanks to the excellent adhesion and leveling properties of the Epon primer, expensive sanding operations are reduced to a minimum. Troy engineers estimate that the new finishing system saves as much as a dollar a gallon on materials, in addition to savings in labor costs.

• • •

Call on our sales offices for names of suppliers who sell Epon resin coatings. Write for the full Epon coatings story in the new brochure, "Planning to Paint a Pyramid?"

SHELL CHEMICAL CORPORATION

Chemical Partner of Industry and Agriculture

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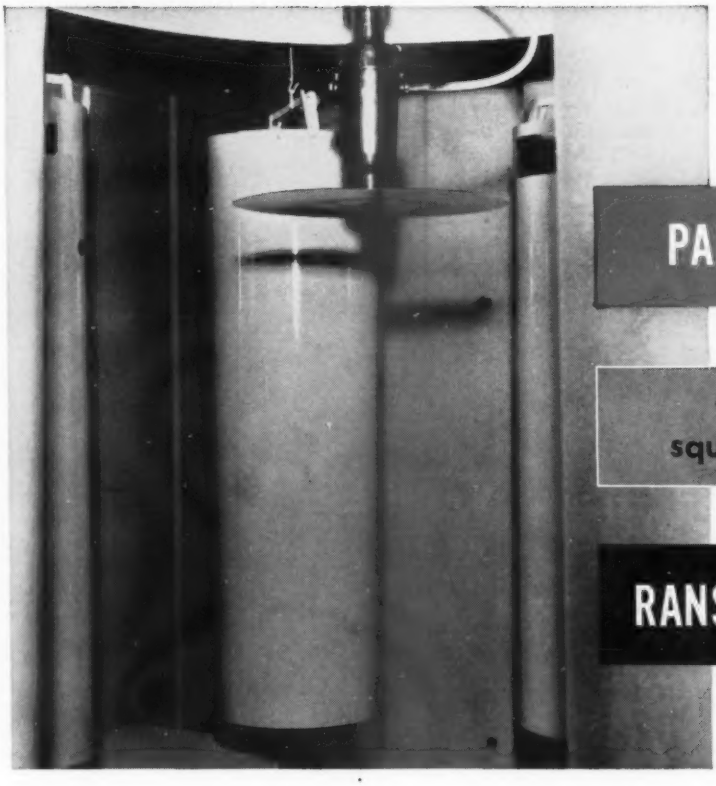


PAINT MILEAGE JUMPS

from 370 to over 600 square feet per gallon with

RANSBURG NO. 2 PROCESS

When General Water Heater Corp., in Burbank, Calif., switched from hand spray to Ransburg No. 2 Process in painting water heater jackets, paint mileage increased almost 65%. Where General formerly got 370 square feet per gallon of paint, they now get over 610 per gallon.

On this installation, units ranging from 20 to 100-gallon size are painted with Ransburg No. 2 Process reciprocating disc atomizer. Changes in jacket sizes can be made without stopping the conveyor. With the reciprocating disc atomizer, change in stroke length is made "on the fly" without shutting down production. General also paints smaller parts, such as heater tops, bottoms, doors and legs, with the Ransburg equipment.

In addition to paint and labor savings, General Water Heater is getting "excellent consistency" and a high quality finish on their products. Another on-the-job-example of the unmatched efficiencies of the Ransburg No. 2 Process of electrostatic spray painting!

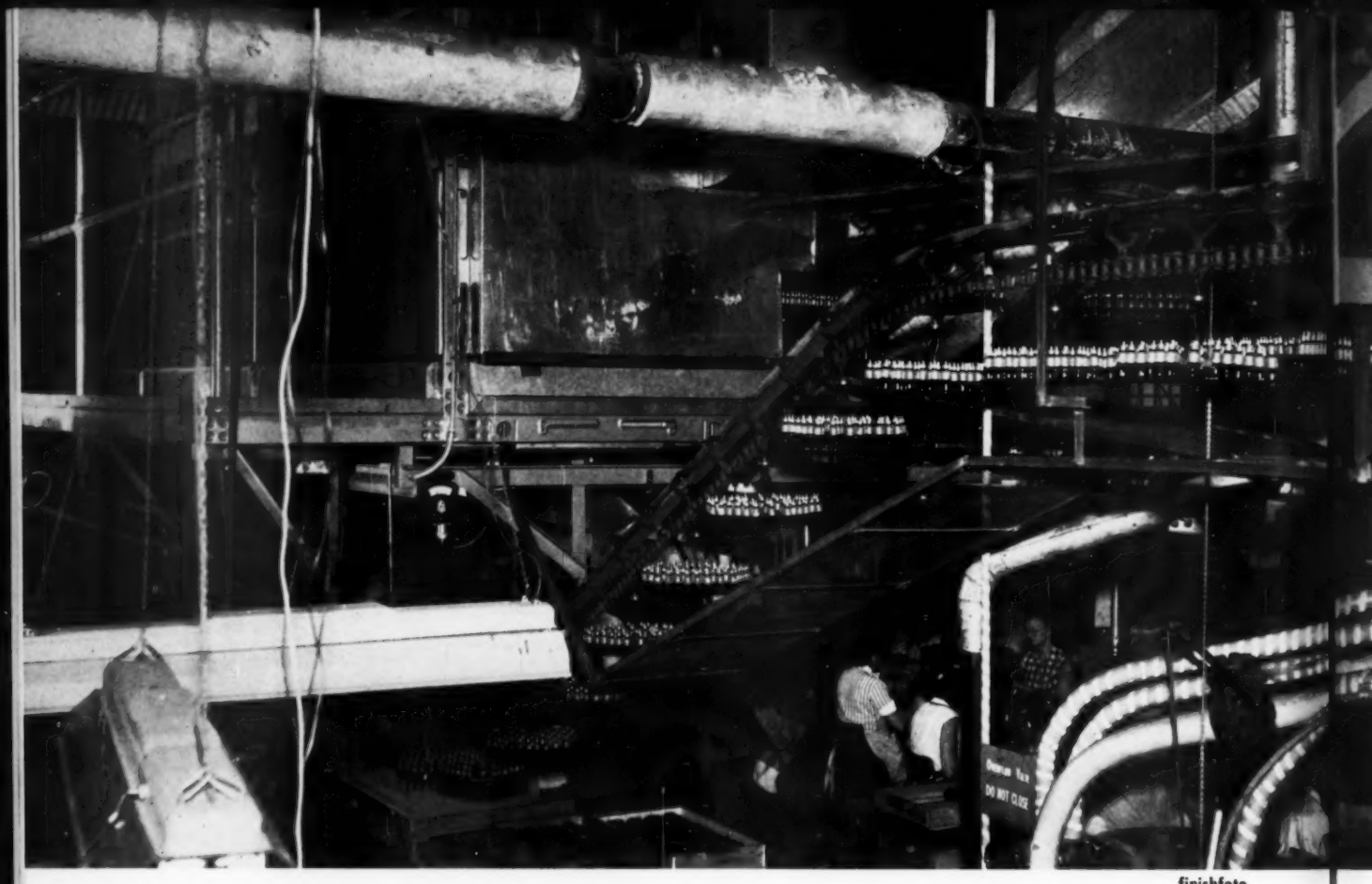
Ransburg maintains complete laboratory facilities for test-painting YOUR products under simulated production conditions. Why not let us show you what Ransburg Electrostatic Processes can do for you in YOUR finishing department. No obligation.

Ransburg **ELECTRO-COATING CORP.**

Indianapolis 7, Indiana

RANSBURG

For further information about Electrostatic Painting Processes and complete Ransburg services, write Dept. F



finishfoto

Sunbeam finds varied uses for infra-red

including annealing and stress relieving chrome-plated ware, baking finishes on small appliances, and baking varnish coating on electric motor armatures

SUNBEAM Corporation, Chicago, manufacturers of small electrical appliances, has found varied uses for infra-red ovens in its manufacturing processes.

Automatic varnish dip and baking of electric motor armatures

The most recently installed oven is an integral part of a unique enclosed varnish dipping and baking system for electric motors armatures for Mixmasters and Shavemasters. *(photo A)*

Following assembly, the armatures are loaded in circular wire trays which are then hung on a monorail overhead conveyor that carries the ware up into the overhead finishing system. The five-pass oven is 30 feet long, 10 feet 4 inches wide, and 4 feet 6 inches high.

Approximately 1500 armatures are varnish dipped and baked per hour at a chain speed of 1 foot per minute. The finishing cycle is as follows:

Pre-heat .....30 minutes
Varnish dip
Bake .....30 minutes
Varnish dip
Bake .....30 minutes
Varnish dip
Bake .....60 minutes

Temperature in the oven is maintained between 300° and 325° F. The oven rating is 64 kw radiant, and 60 kw convection. The cycle is shorter than that formerly used in batch-type ovens.

Stress relieving

Another oven is used for annealing and stress relieving chrome-plated Coffeemaster pots, following the plating operation. Operating at 450° F., more than 540 pounds of ware per hour pass through this 60 kw oven at a conveyor speed of 6 inches per minute. *(photo B)*

This 28-foot long, single-pass oven extends to 49 feet when you include the additional space for heat locks.

The oven is 4 feet 2 inches wide and 6 feet high.

Baking organic finishes

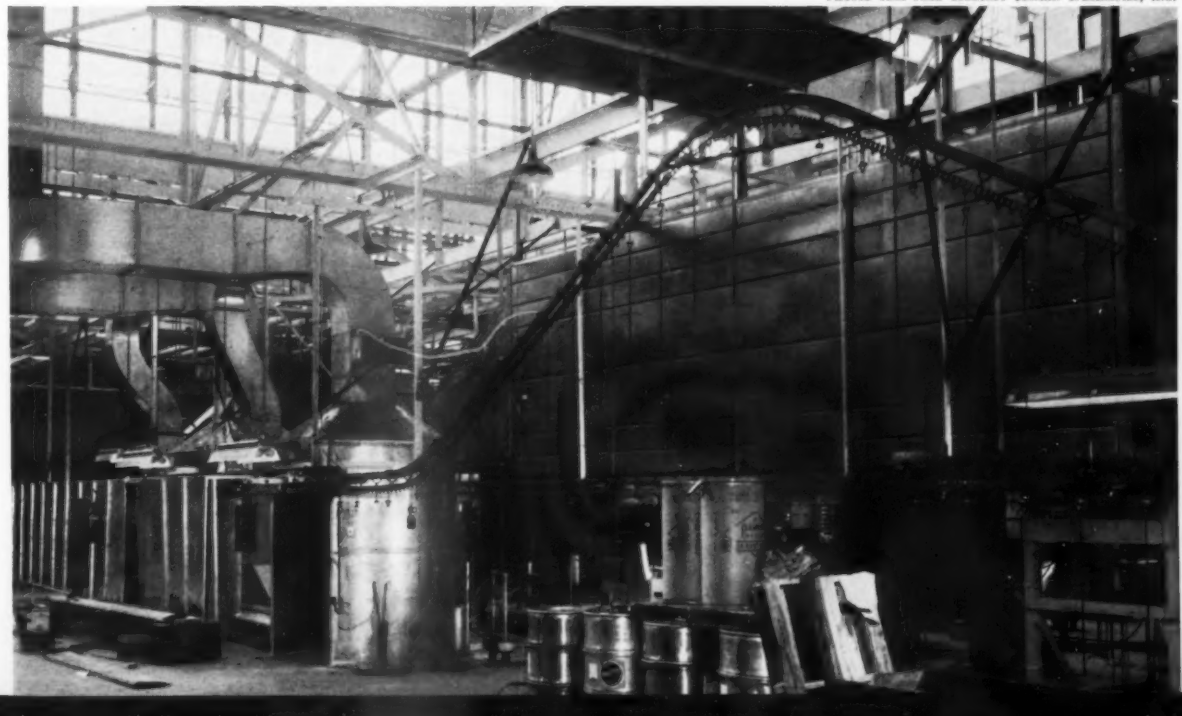
A third oven forms part of a versatile finishing system. Because of a special conveyor set-up, Sunbeam has a choice of sending parts of its deep fat fryers, waffle irons, or lawn sprinklers through a dip tank, a hand spray booth, or electrostatic spray booths — and then through a four-pass oven. *(photo C)*

Ware to be baked is hung on conveyor hooks which can be spaced in multiples of 3¼″ apart. These hooks rotate on the first pass through this oven, with temperatures adjustable between 300° and 375° F. A total of 1800 pounds of ware per hour pass through the oven at a conveyor speed of 9 feet per minute.

This 28-foot overhead oven has an overall length of 42 feet 4 inches when heat locks are included. Width is 10 feet 8 inches; height 9 feet 1 inch.

An indicating temperature control, over-temperature safety shut-off, magnetic interlock with conveyors and air system, plus time controls for purging at start-up are all included in this oven. The recirculating air heaters total 72 kw, radiant heaters 104 kw.

PHOTOS THIS PAGE COURTESY JENSEN SPECIALTIES, INC.



The Gibson refrigerator has come a long way since the early thirties

... and so has Du Pont DULUX® enamel!

America's leading home-appliance finish
. . . has helped sell 36,000,000 refrigerators!

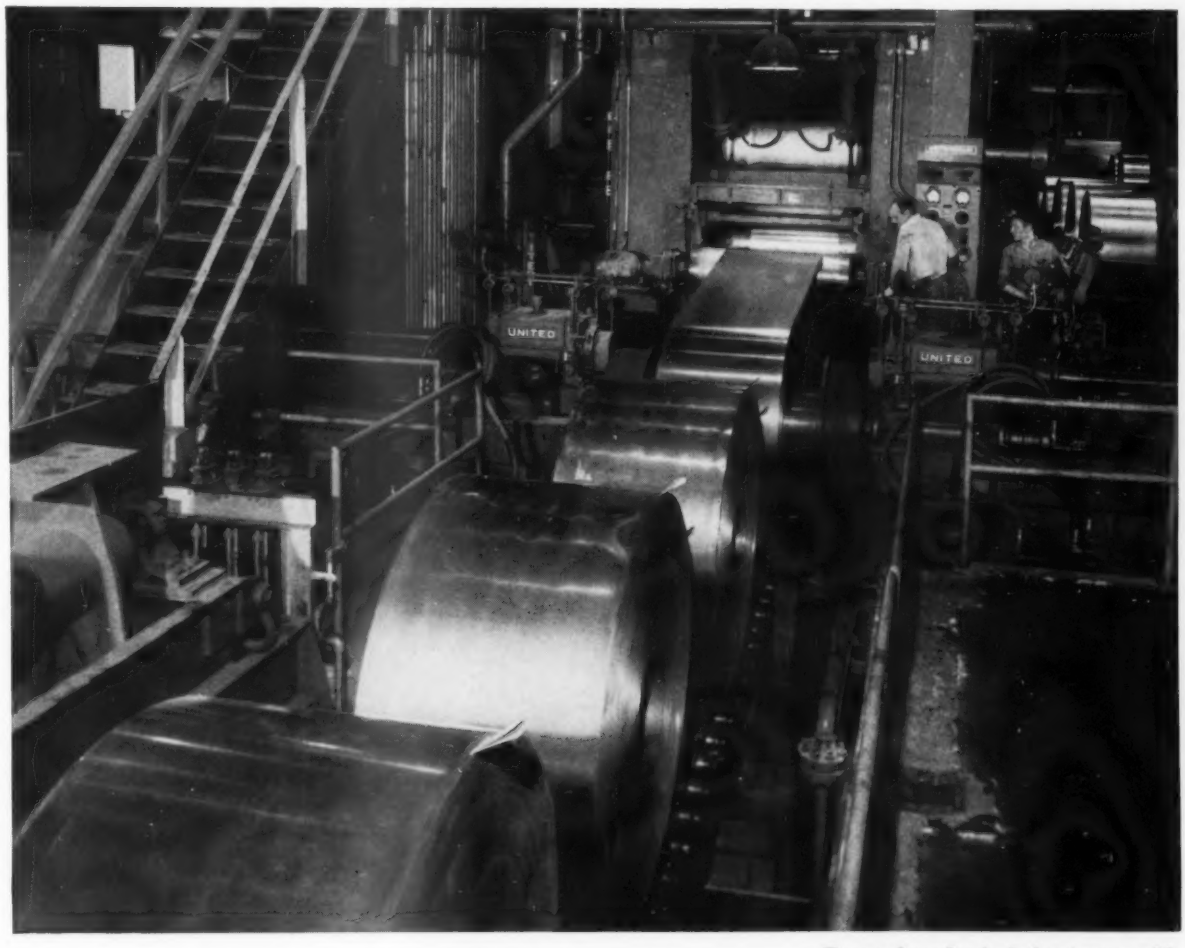
The first Gibson refrigerator was welcomed—'way back in 1931—for the convenience and extra leisure it gave housewives everywhere. Yet over the years the Gibson Company has developed a refrigerator that gives modern homemakers greater efficiency and smarter design than the shopper of 24 years ago could ever imagine. Yes, the demand for the 1955 Gibson, with push-button or automatic defrosting, proves once again that continued improvement is vital in maintaining the acceptance of the buying public.

And so it is with America's leading home-appliance finish—Du Pont DULUX Enamel! Constant research over the years by Du Pont chemists has resulted in more rugged resistance to chipping, cracking, scratching or staining . . . easier cleanability . . . longer-lasting whiteness than ever before. That's why the DULUX of today meets the most exacting requirements of *today's* topflight appliance manufacturers. E. I. du Pont de Nemours & Co. (Inc.), Finishes Div., Wilmington 98, Delaware.

DU PONT
REG. U.S. PAT. OFF.

"DULUX" ENAMEL
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Let's discuss your requirements NOW for cold rolled sheets and strip



Tempering sheets in our new cold-rolled mill, Indiana Harbor Works, East Chicago, Ind.

●Our new continuous cold-reduced mill at East Chicago is turning out the finest sheets and strip that modern equipment can produce. And we are running on a full schedule to meet the heavy demand.

But more and more customers want more and more sheets. Our output is booked for weeks ahead, so you can help us to help you by letting us know your requirements right away.

Let's discuss your sheet and strip problems. Call our nearest District Sales Office now.

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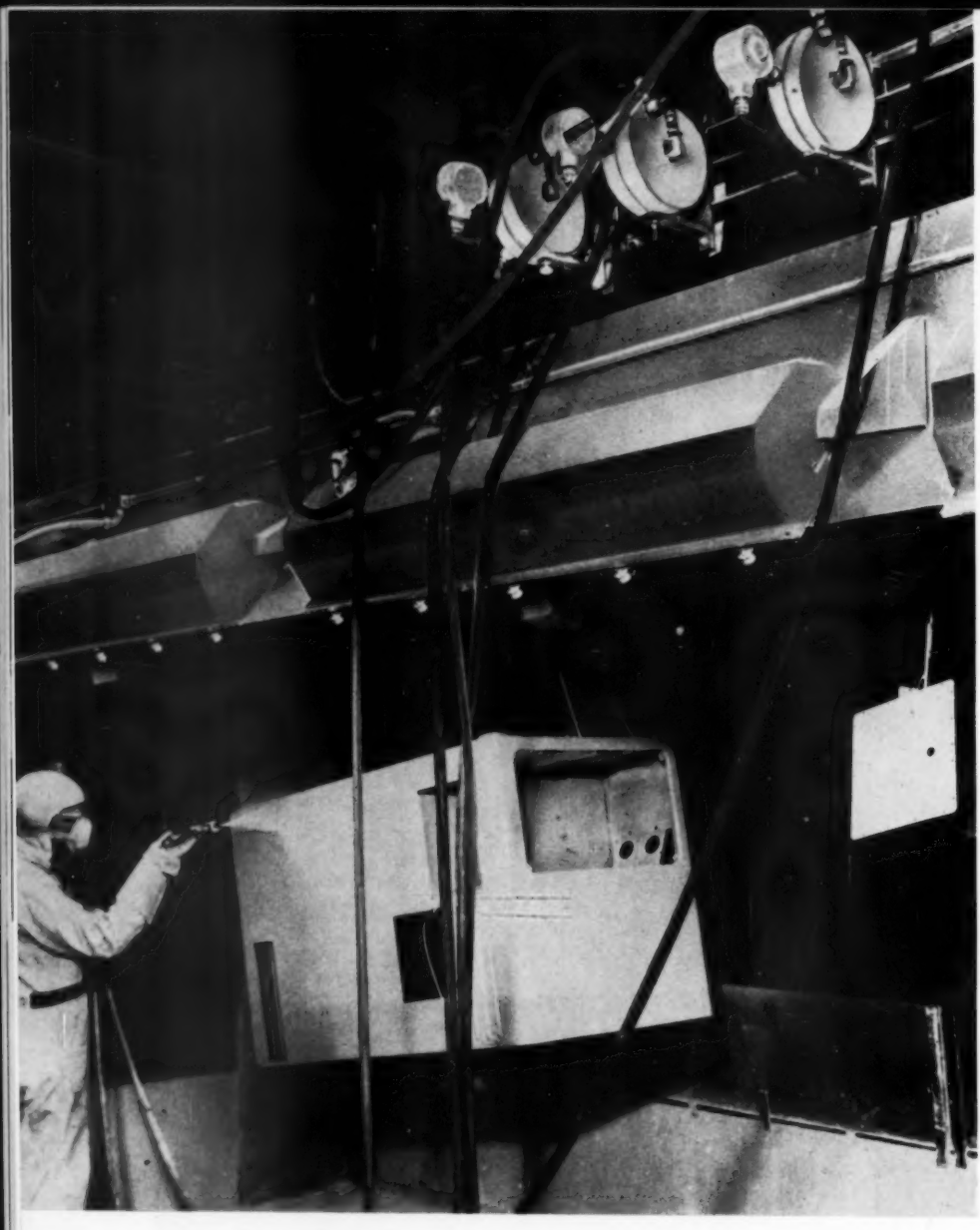
Youngstown

COLD ROLLED SHEETS AND STRIP

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES



Ben Hur Manufacturing Co., of Milwaukee, Wis., manufacturers of home freezers, reports a 65% reduction in paint rejects plus improved finish quality through the use of the hot spray process.

Hot spray comes of age

a paint department tool for production control and quality improvement

by Gustave S. Levey • PRESIDENT, THE SPEE-FLO COMPANY, HOUSTON, TEXAS

Exclusive feature finish

Mass production techniques have produced miracles in American Industry, and it is claimed that progress has only begun with the development of mechanical and electronic automation processes.

One major phase of manufacturing has been difficult to harness to precise production control. Production painting, unlike processes such as turning, cutting, boring and packaging, has, in many plants, remained a "problem child" to plant managers and methods engineering departments. In many instances well designed tooling assures consistent and uniform production of product — until it arrives at the paint department where it frequently retrogrades to a comparative "horse and buggy"

control. Requirements for good finish demands a precise deposit of a liquid film, regardless of variable surface conditions and shapes. The spraying operation would be critical enough if it were not subject to a host of other variables that have defied drawing board control. The limits of quality control are constantly subject to daily variations of *temperature, humidity, air pressure,* and, to an important degree, "how the operator feels today".

Hot spray enters the picture

One successful assault on this thorny problem was made when the hot spray process was developed over ten years ago. The substitution of heat for thinner carried a great appeal in solvent savings, faster drying, and the ability to lay on a heavier coat without the tendency to sag or run. Contrary to popular concept, hot spray paint materials are not sprayed hot at all, but reach the surface at or near room temperatures! ! This is because the paint material is raised above the boiling point of its solvents, but, being in a closed pressure system, these solvents cannot evaporate. They do, however, evaporate rapidly as the material leaves the spray gun, which produces cooling of the paint material before reaching the surface. *The most significant phenomenon of the hot spray process is that the paint solvents fulfill the function of viscosity reduction at the gun, but are largely evaporated before reaching the surface.* The end result is a heavy bodied, low solvent content film deposited on the surface.

The practical effect of heavy bodied low solvent content film

Faster application is achieved because hot spray produces a greater film build per spraying pass. The hot sprayed film is smoother and more uniform because less pressure is required to atomize the heat thinned material. Gun blast and orange peel are reduced or eliminated. Much wasted overspray is converted into production savings Coverage on all surfaces is greatly improved because of the heavier bodied film. Rapid evaporation of heated solvents—*after* leaving the gun and *before* reaching the work — produces the high solids film deposit. This evaporative effect of higher solids aids coverage and reduces film shrinkage and in turn tends to create better gloss.

Editor's Note:

Earlier articles in *finish* have covered the practical application of the "hot spray" process for organic finishes on metal. Application articles have included products from appliances to aircraft. Current interest in the subject suggested the publication of this progress report as prepared in 1955.

Heaters have been simplified

Early devices were designed much like hot water heaters or steam cleaners, consisting of coil type heat exchangers. Possible weaknesses included tendency to clog and restrict fluid passage and heat transfer. Those equipped with gear pumps sometimes failed from the abrasive action of pigmented materials. These weaknesses lead to the design of simplified equipment. For example, one unit of coil-less design holds only 1½ ounces of material at a time, yet has capacity of over 7½ gallons per hour. Construction permits a very high heat exchange ratio and operation of the metal temperature well below the "cooking" point of paint materials.

For intermittent applications, centrifugal pumps have been developed without bearings or close tolerances to minimize trouble or service in circulating paint from heater to gun.

Used with electrostatic equipment

There is a growing use of heater units on the various electrostatic systems. *Finish* magazine has given much editorial coverage to electrostatic application. The advantages of the electrostatic systems are very great indeed. The requirements for this type of application call for a much greater reduction than would even be required for cold spray conventional application.

For example, an industrial enamel that is reduced 25% for conventional

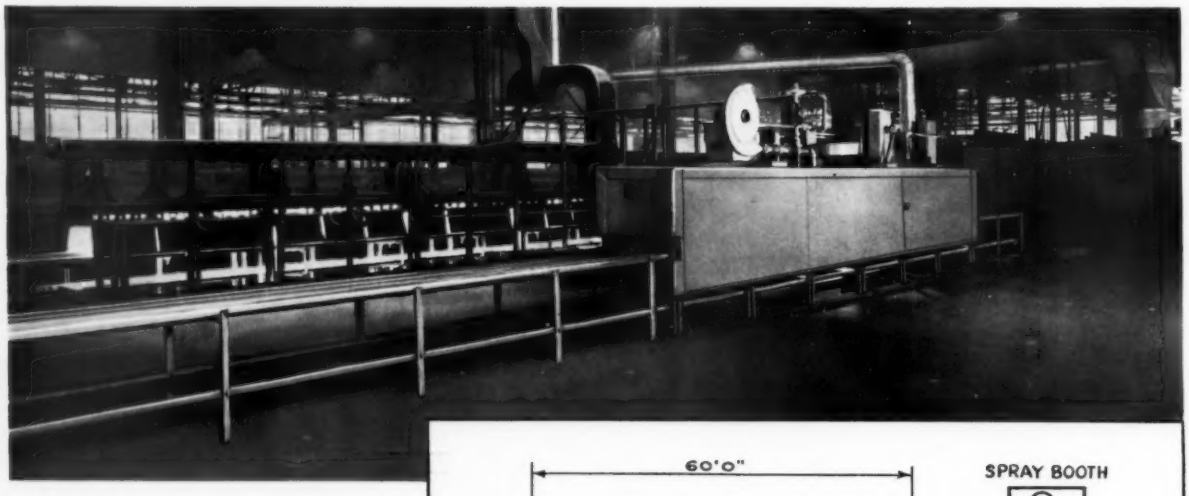
to Page 83 →

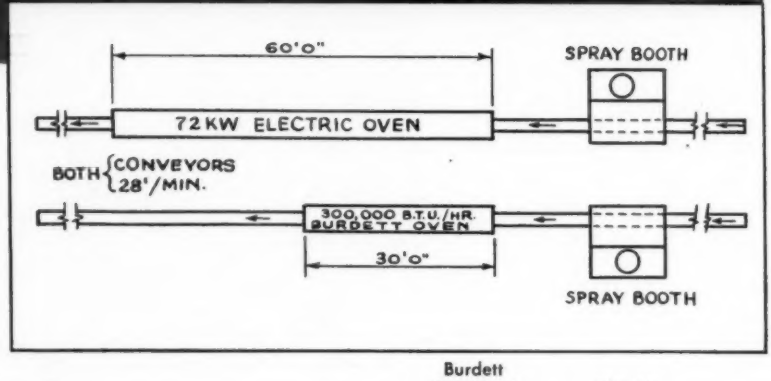
Childers Manufacturing Co., of Houston, Texas, reports material savings, faster dry and quality control improvements as a result of "hot spray" finishing of aluminum awnings.

Compare!

1. Your paint finishing costs with these Burdett "Radiant Heat" costs.

2. Your present finish with this tougher finish from a Burdett oven.





Evaluate this representative installation in a large steel fabricating company, which provides excellent comparison between a Burdett gas-fired "Radiant Heat" oven and an "electric" Infra-Red oven. This same comparison may apply to your operation.

Results . . .

Metal temperature is higher upon leaving the 30' Burdett "Radiant Heat" Oven than upon leaving the 60' electric oven. This is your proof of greater rate of heat transfer in the Burdett Oven, and with only ½ the oven size. Everyone is cost conscious and only Burdett "Radiant Heat" can produce these results.

LET US PROVE THIS

By actually testing your product and finish in our laboratory oven.

Write for our recommendations on your finishing system needs

		Burdett Gas-Fired "Radiant Heat" Oven	Electric Drying Oven
Operating Cost		$0.21 per Hr. (Based on Chicago rates)	$1.44 per Hr.
Oven	Input	300,000 BTU/Hr.	72 KW/Hr.
	Length	30'	60'
	Width	4'	4'
Conveyor Speed		28'/min.	28'/min.
Finish		Tough	Satisfactory
Bake		Thorough	Fair
Kind of Paint		same	
Kind of Production		same	
Type of Operation		continuous	

BURDETT
MANUFACTURING COMPANY

3401 West Madison Street, Chicago 24, Illinois

Detroit Philadelphia New York Cleveland Dallas

Manufacturers of
OVENS, "RADIANT HEAT" SYSTEMS, HEATERS, WASHERS, SPRAY BOOTHS AND AIR MAKE-UP UNITS

New Supplies and Equipment

C-10. Non-inflammable cleaner

New This new cleaner, known as No. 400-K, was developed as a non-inflammable cleaner for wiping, or brushing or dip cleaning off oily or greasy machinery, press pits, dies, floors, etc. Also for production parts requiring hand pre cleaning with solvent. This new product has excellent detergency for all types of shop dirt and grease, requires very little rinsing of the cleaning solution, may be diluted with water, which makes it economical to use and has absolutely no fire hazard involved in its use.

C-11 New two-terminal sub-miniature pilot lights

New A new sub-miniature series which mounts in a single 15/16" clearance hole and requires no insulating mountings is offered. The socket, lamp and all connections are well-insulated from the mounting bushing. Phenolic material of military specification grade provides the insulation. This series is designed to employ any of the five standard midget flanged base incandescent lamps of voltages 1.3; 2.7; 6.0; 14.0; and 28.0. AN specifications are fully met.

"Omnidirectional" visibility is afforded by the stovepipe shaped cap of high heat plastic, into which the bulb extends so that its glow is visible from all angles. The cap may be of one of three types: non-diffusing (transparent); light diffusing; completely diffusing. Clear, or any of 6 colors may be specified.

C-12 Silicone aluminum paint

New The materials used in many of the combustion chambers and burner supports manufactured for jet engines must remain unaffected by abnormally high temperatures. Aluminum clad steel solves the problem satisfactorily with exception of various fusion welds. These must be recoated with aluminum or a noncorrosive coating that will withstand up to 800 F. This new paint sprayed or dipped on the welded part with two coats and then baked at 400 F. for one hour provides the required protection. Perhaps it can solve one of your problems.

C-13. New stainless steel gas range burner 640% lighter than conventional burners

New These top range gas burners are, according to the manufacturer, 640% lighter than conventional burners. Made of stainless steel, four of these new burners weigh 2½ lbs. as compared to the indicated average of 16 lbs. for conventional burners.

Unique "cross-port" construction of burner enables reduction in size, and permits a single burner to be connected to a single-duty valve. No separate burner, valve and venturi tube are required for simmer action, since one burner permits unlimited number of heating speeds from rapid boiling down to "keep-warm." Cast iron burner heads and venturi tubes have been eliminated in the burner assembly, and replaced with lightweight, rust-proof, enamel-coated steel tubing.

More Information

For more information on new supplies, equipment and literature reviewed here, fill out the order form, or write to us on your company stationery.

Standard size burner has a BTU range from 9,000 down to 500, and giant size burner from 12,000 to 600. It burns all commercial gases. No need to change burner caps, or to redrill burner ports, when occasion demands conversion to a different gas.

C-14. Interchangeable air-inflated grinder

New The development of interchangeability in air-inflated grinding wheels has been announced. Drums are standardized to fit stand-

ard cores, enabling users to stock a complete line of wheels for a single core. The grinding principle is based upon a rubber drum similar to a tubeless tire. While the rubber wheel is deflated, the grinding operator fits an abrasive band over the outer sur-

to Page 48 →

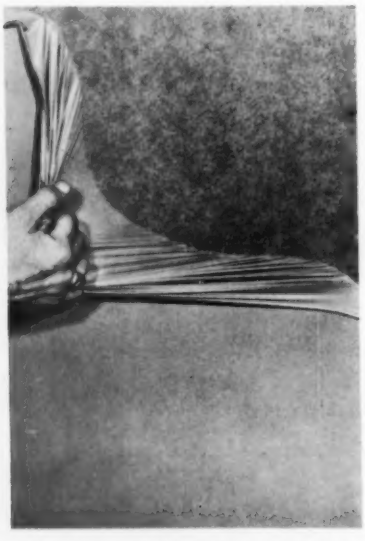
face. The rubber drum is then slightly inflated with air to whatever hardness is required by the operation at hand. Newly developed models 525 and 630 feature exacting concentricity to prevent wobble or chatter during grinding and to insure better contact between wheel and work. The 525 weighs less than one pound.

C-15. Rust-inhibiting phosphate coating

New This new coating is reported to improve appearance and durability of painted finishes on all metal appliances, metal furniture, automotive parts, etc. It is stated that salt spray tests have proven the new coating to triple painted metal finish life. Easily applied to metal by immersion, the manufacturer states the new coating meets all government specifications and has a wide application wherever appearance and durability of painted finish is important to manufacturer and consumer.

C-16. An aluminum-pigmented strippable coating

New Production of an aluminum-pigmented strippable coating has been announced. It provides a fast, economical method of



protecting metal surfaces during interim periods and may be applied by either brush or spray. It may be used advantageously on all types of metals during both inside and short-term outside storage; on polished surfaces to prevent marring and scratching; for coating idle tools, dies, etc; to protect against die marks in stamping operations; as a removable film on inner surfaces of spray booths; and as a web coating to completely enclose bulky objects. It requires no surface preparation and can be stripped off easily when desired without leaving a greasy residue. The aluminum pigment inherent in the coating helps to provide maximum surface toughness and assists in forestalling moisture transmission. A film 3 mils thick, sufficient to provide adequate strength for stripping, will dry to handle in 5 to 10 minutes under average temperature and humidity conditions.

C-17. Phosphate coating material announced

New This new product, called Klem Kote #1105, contains improved accelerators which give exceptionally good cleaning to the metal, especially where carbon smut is a problem. It is a moist white powder used on both ferrous or non-ferrous metals that produces a tight iron-manganese type coating. Can be used in either spray type of immersion cleaning equipment. The manufacturer states that it is extremely efficient in a 3-state spray operation.

C-18. Two new pressure-sensitive film tapes

New Two new pressure-sensitive film tapes — each possessing unusual strength although only 2-mils thick — were announced this month. Both tapes posses "excellent" resistance to acids, alkalies, ketones, hydrocarbons, esters, and other common solvents, as well as excellent resistance to all sorts of weather conditions. Other properties include 25 lbs. tensile strength per inch of tape width; 100% elongation, and 40 ounces of adhesion per inch of width. In addition, the tapes retain their flexibility at very low temperatures, and have high dimensional stability despite heat and humidity changes. Their polyester film backing is said to be two to eight times stronger than other plastic films.

C-19. Laboratory jar

New A newly designed one-gallon porcelain laboratory jar for use on roller-type laboratory ball mills is now on the market. All of the bronze hardware is recessed to

prevent any catching, grabbing or holding while the jar is being revolved on the mill. The new jar has a tough, long-wearing ceramic body of the highest grade. The lid locks securely in place and the jar is sealed with either a rubber or a neoprene gasket.

319. "Modern Plant Layout"

New This leaflet points out how you can reduce layout planning costs with new photocopy system. Covers all the equipment and materials used in the procedure.

320. New bulletin on finishing room air-conditioning units

New This new bulletin provides valuable information on the finishing of room air-conditioning units. It contains the latest information on coverage rates, baking schedules, metal preparation, priming and enameling. It all adds up to how you can obtain better appearance and protection for your units.

New Industrial Literature

301. "Abrasive Grain and Powders"

New This booklet is packed with informative charts and illustrations. Topics include "Properties of abrasive grain and powders," "Elements of metal polishing," "Preparation and care of polishing wheels," and "General rules for good polishing." This 42 page booklet also contains a suggested layout for set-up room and curing room.

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302. "Re-usable Containers and Special Products

New This sixteen page, two color brochure describes many of the advantages that can be gained through the use of re-usable metal containers. Some of the features described are handles for easy lifting, valves to eliminate atmospheric dangers and simplicity in the closing and opening operations.

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303. Heavy duty soak tank cleaner

New A new heavy duty soak tank cleaner with maximum detergent power has been announced. The cleaner, designated as No. 36, is for electroplating and porcelain enameling. It is claimed to be more effective at 2/3rds concentration than other cleaners are at full strength.

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304. "Automatic Dictionary"

New This little "Automation Dictionary" covers some 87 words and phrases, all of which had their origin with the engineers but are now creeping into the lexicon of today's modern businessman. Lest their engineering brethren cry "treason," the designers of the simplified booklet carefully point out that it was primarily designed "for those whose knowledge of automatic control is largely limited to the setting of the thermostat on the living room wall."

305. 1955 Silicone reference guide

New Twice the size of last year's, the catalog lists some 23 brand new products besides the 100-odd mentioned in the previous issue. Still retained is the "division by application" method of listing the individual products. This application index has been increased from 17 to 21 classifications. The guide contains many tables, graphs and photos and is full of facts.

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306. Folder on air inflated grinding wheels

New A new six-page folder describing a complete line of air inflated grinding wheels is available. In addition to showing views of the various models and describing their uses, the new folder shows an exploded view of the air-inflated grinding wheel, its ease of versatility of mounting and disassembly. An entire page of the folder is devoted to the various applications of the grinding wheels in finishing work of all types.

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307. "What You Should Know about Vapor Degreasing"

New A leading company offers a free 12-page illustrated booklet "What You Should Know about Vapor Degreasing." With an introduction on the principle of vapor degreasing, the booklet describes the solvent cycle, the vapor degreaser, the vapor spray degreaser, the liquid vapor degreaser and a new hydraulic lifter for batch type degreasers.

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308. Tangent bender brochure

New Should be of interest to all men concerned with fabrication. This descriptive brochure provides latest information on tangent bender equipment.

309. Pressure Sensitive Tape Council

New The pressure Sensitive Tape Council which is working at the job of standardization in nomenclature and test methods within the pressure sensitive tape industry, has prepared a brochure of facts and information about itself. This brochure lists the members of the council who are producing and marketing pressure sensitive cloth and paper tapes.

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310. Corrosion resistant primer

New LockPrime, a corrosion resistant liquid primer for new or corroded steel surfaces, has been developed. Applied by brush or roller directly from the can, it is stated that LockPrime offers excellent resistance to under-cutting by corrosion when cover coats are mechanically damaged. On either sandblasted new steel or wirebrushed rusted steel, it forms a tight adherent bond to the surface and provides excellent adhesion for following top coats. It is equally effective in acidic and organic atmospheres.

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311. New use guide for metal industries

New A new guide to the use of products for the metal working and metal finishing industries has just been issued. Known

as form 2199, simple directions are given for 12 major cleaning, stripping or processing operations. Under

to Page 50 →

the 12 operations, 40 recommendations are given for products that fit various plant conditions. The list of major operations discussed includes: barrel finishing, deoxidizing, electrocleaning, neutralizing, paint stripping, soak cleaning, cleaning and phosphating, oil and water absorbent, paint spray booth maintenance, rust and scale removal, protection against rust and washing machine cleaning.

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312. New bulletin on industrial solenoids

New A bulletin describing the complete new line of strongbox industrial solenoids is available. The four-color 16 page publication contains information on product features, laboratory tests, and general application rules. A cross-reference chart equates this new line with corresponding models in the former line, and shows the proper model to be chosen for given requirements of force and stroke. The bulletin also shows force and current curves, and dimensions for both push and pull types.

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313. New bulletin on Oil-Tight push buttons available

New A new bulletin describing the complete line of oil-tight push buttons, selector switches, and accessories, is available. The four-color 16 page publication contains information on product features and applications, and complete ordering directions for push buttons, lights and combination units, operators, contact blocks, nameplates, stations and accessories.

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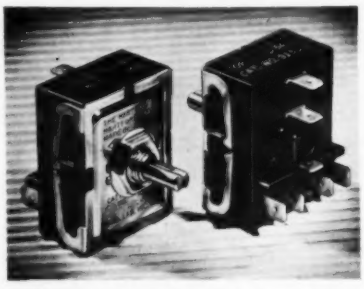
314. Rotary motor-reversing switches

New A new series of rotary motor-reversing switches, extremely small for their capacity, has been developed. Designed for control of single phase motors up to two horsepower, the bases of the new switches measure only 1-27/32" by 1-21/32" by ⅞". They are horsepower rated from ½ to 1 H.P., 120 V., and up to 2 H.P. and 20 A., 240 V., A. C. only. Circuits are available for basic motor types with "off" in center and two speeds each side of center (with or without mechanical



latching in "off" position); "off" in center with one speed each side or full rotary, 4 positions.

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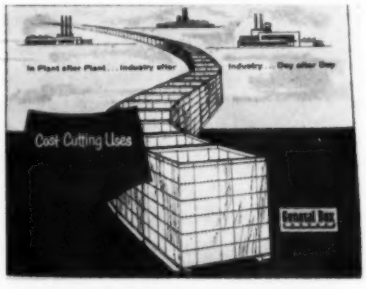
315. Folder on pallet boxes

New A new 12-page folder on pallet boxes has just been released. It describes and illustrates how low cost wirebound pallet boxes



are used in industry for production line hoppers, intra-plant shipment of parts, assembly line bins and as permanent storage bins for manufacturing and other industries. Various skid designs for simplified lift truck handling are illustrated.

316. New vitreous enamel coating for aluminum castings

New This new finish enables you to put a vitreous enameled finish on aluminum castings. The new finish is said to offer sales appeal, color, surface protection, design potential plus the basic advantages of aluminum castings.

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317. Automatic home appliance timer

New The timer is a heavy-duty, self-powered, clock-type unit which can automatically operate either an electric switch or a mechanical linkage. It is especially applicable to gas or electric ranges and washing machines. Lever type escapement assures accurate timing over the complete cycle. Sealed-in construction prevents entrance of moisture and foreign matter. Initial lubrication is sufficient for years of constant service. It can be mounted in any position. Switches accommodate push-in terminals to facilitate quick electrical connection. These units are available for 15, 30, 60, 120 and 240 minute time cycles, each corresponding to a complete rotation of the pointer.

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318. Pre-plated metals

New A 24-page booklet of illustrations and data covering properties, uses and fabrication techniques for pre-plated metals. Points out design, production and sales benefits of using this type of material.

FINISH
York Street at Park Avenue
Elmhurst, Illinois

Please forward to me at once information on the new supplies and equipment and new industrial literature as enumerated below:

No.____ **No.**____ **No.**____ **No.**____

No.____ **No.**____ **No.**____ **No.**____

Name _____ **Title** _____

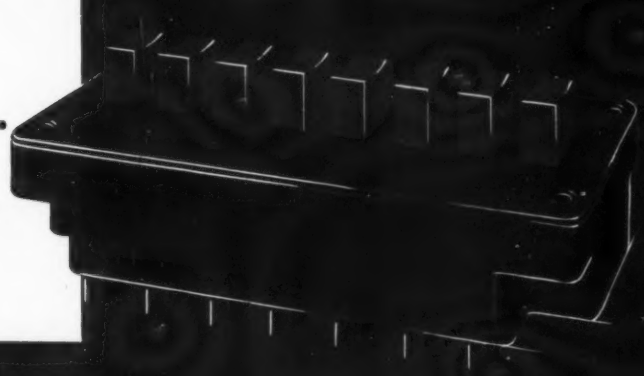
Company _____

Company Address _____

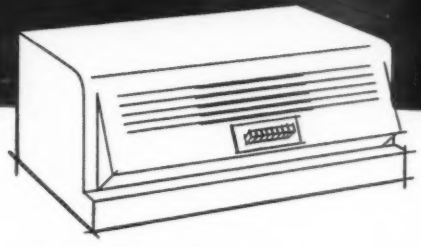
City _____ **Zone**____ **State** _____

for CONTROL...

of multiple electrical loads in various combinations



the NEW



Soreng Push-Button Switch

This is the Push-Button Age . . .

Every electrical appliance becomes more desirable when satisfying the consumer's demand for the convenience of push button controls. You can take advantage of this modern trend by letting Soreng engineers help you design this push button switch into your air conditioner, electric range, dryer, automatic washer, or any other electrical product.

Special features of Soreng's push-button switch:

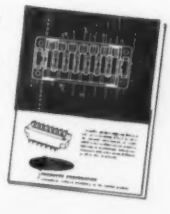
Will selectively control a multiplicity of electrical loads in various combinations • Two to eight multiple selectivity circuits possible • Rated: To customer's specifications • Momentary contact circuits available • Button grouping with or without interlocking • Button color to customer's specifications • Spade or screw terminals • High operating life cycle.

The above characteristics provide considerable latitude for your own specifications. Soreng engineers are available for consultation and will assist you in custom designing this switch to meet your exacting requirements.

Learn how Soreng's versatile push-button switch can be adapted into the design of your modern appliance . . . at low production line prices.

Write today outlining your particular application, and your inquiry will receive the immediate attention of our engineering department.

For details of Soreng's push-button controls, write for folder No. SL-1.



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PRODUCTS CORPORATION

9559 Soreng Avenue, Schiller Park, Illinois • *Plants: Schiller Park, Ill., Fremont, O., Spring Valley, Ill.*

OTHER SORENG PRODUCTS FOR THE APPLIANCE, AUTOMOTIVE AND AIRCRAFT INDUSTRIES

Is architectural porcelain "growing up"?

interest in architectural porcelain accelerating at a fast pace—meeting in Chicago draws wide attendance from metal product manufacturers

A RAPIDLY accelerating interest in architectural porcelain was evidenced at a conference held at the Sheraton-Blackstone Hotel, in Chicago, January 26-27, under the sponsorship of the Porcelain Enamel Institute.

The meeting was attended by architectural porcelain manufacturers and contractors, and by industry suppliers (aluminum, steel, insulation, caulking and sealing materials, adhesives, finishing materials and equipment), as well as by representatives from other finished product manufacturers.

In addition to companies currently engaged in architectural porcelain work, the following companies were among those having representatives at the conference:

Caloric, Heintz, Alcoa, Celotex, U. S. Steel, Ingersoll, International Harvester, Reynolds Metals, Rheem, Republic Steel, Pittsburgh-Corning, Armco Steel, Benjamin Electric, A. O. Smith, Youngstown Sheet & Tube, Temco, and Minnesota Mining.

The address of welcome at the "Conference on Architectural Porcelain" was presented by Glenn A. Hutt, of Ferro Corporation, and president of the Porcelain Enamel Institute. The attendance of more than a hundred persons was "beyond expectations," stated Hutt.

Cooperation needed

J. W. Vicary, of Ervite Corporation, and chairman of the PEI Architectural Division, pointed out that the objective of the meeting was to discuss and exchange ideas which would lead to the development of a definite program for expanding the market for architectural porcelain.

Vicary stated: "Along with the tremendous opportunity in the field of architectural porcelain enamel, particularly in curtain wall type construction, we have a great responsibility—that of providing installations that measure up to, and even surpass, the expectations of the specifiers and users of our versatile material. . . . A great deal can best be done cooperatively. Recommended standards, specifications and tests are excellent examples, and immediate action in these and other areas is proposed."

The big market—hospitals, schools, small office buildings

Milton Male, of U. S. Steel Corp., who acted as moderator for the opening symposium on "Building Codes Problems," stated that the multiples of hospitals, schools, and small office buildings far outnumber the large "spectacular building" in square footage potential for metal-clad buildings.

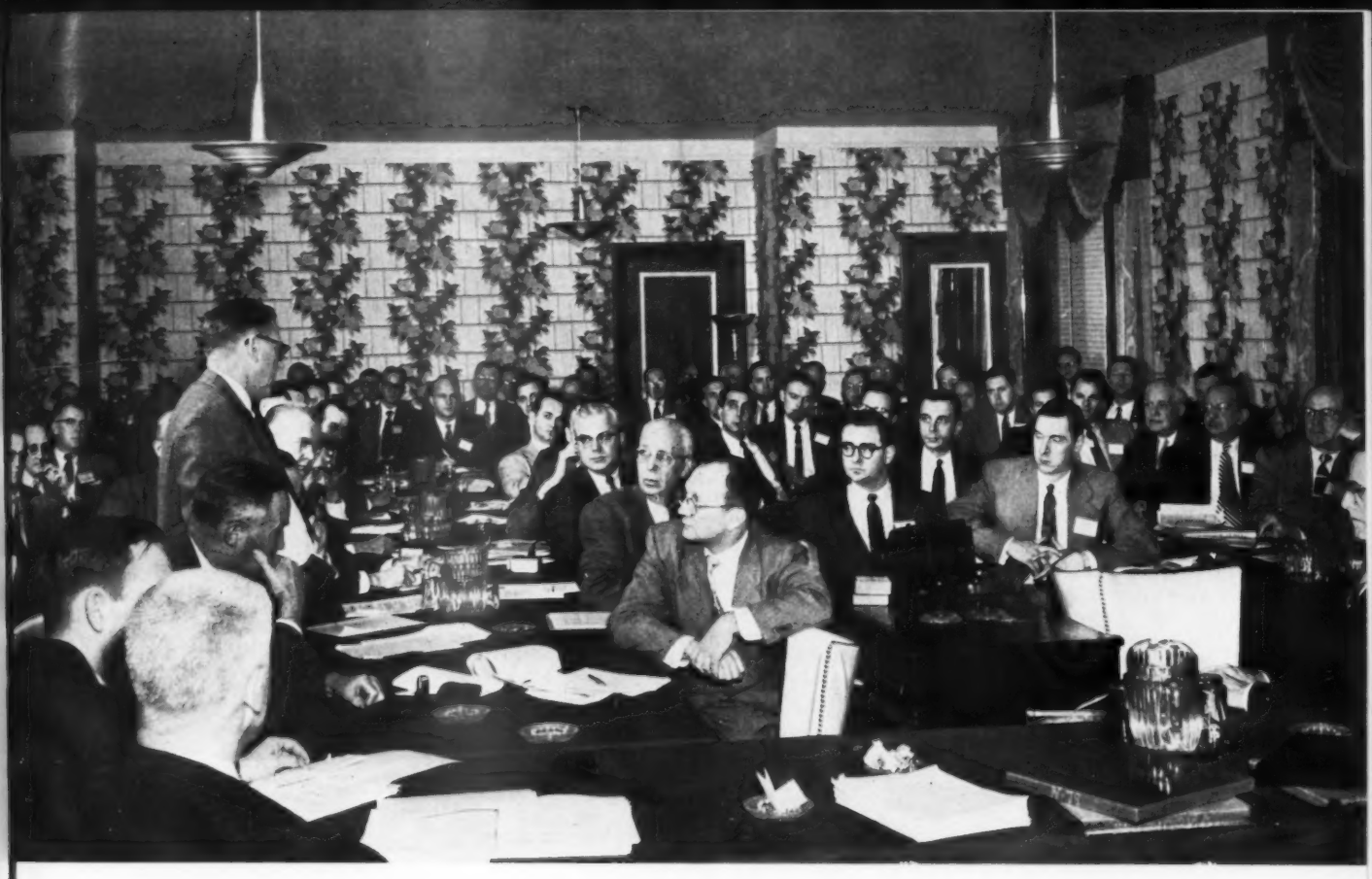
Codes for metal-clad buildings

B. L. Wood, consulting engineer for the American Iron & Steel Institute, opened his address with the remark that old building codes which prescribe the type and thickness of materials for thick exterior walls are o.k. for masonry, but when new thin-wall materials come on the scene, these old codes then become prohibitive codes.

Wood explained that activities of the AISI committee on building codes were responsible in many cases for the

Speakers at the Conference on Architectural Porcelain Enamel included, l. to r.: D. L. Moore, National Bureau of Standards; B. L. Wood, American Iron and Steel Institute; J. G. Terry, Armco Steel Corp.; Milton Male, U.S. Steel Corp.; W. J. Vicary, Ervite Corp., chairman of PEI Architectural Division; J. A. Holcomb, Wolverine Porcelain Enameling Co.,; E. W. Kuenzi, U. S. Dept. of Agriculture; W. A. Barrows, Barrows Porcelain Enamel Co.

finishfoto



general revision of codes which specified "masonry or concrete" exterior walls not less than 8" or 12" in thickness, which obviously disqualified insulated metal panels for acceptance or use under such code requirements.

"The nationally recognized building code standards (the BOCA Basic Code, the Southern Standard Building Code, and the Pacific Coast Uniform Building Code) have adopted the committee's recommendations and have replaced the old descriptive exterior wall requirements with performance standards that are consistent with safety and the severity of the fire hazards that actually prevail. The new edition of the National Board of Fire Underwriters' Code will, we have reason to believe, follow like procedure," Wood pointed out.

Out-moded codes are slowly being revised, and today some 15,000 cities permit metal panels to qualify for exterior use on buildings, stated Wood. In those cities which have not yet changed their codes, Wood indicated that the AISI committee on building codes could be of possible assistance to architectural porcelain contractors in securing code revisions.

Fire rating requirements

J. G. Terry, of Armco Steel Corp., reported on the importance of metal panels withstanding accepted fire tests so as to provide for the safety of a building's occupants, especially from an exterior fire. He urged the use of fire-resistant insulation in connection with curtain wall construction—to help decrease the smoke hazard. Joint design must be such as to permit insulation behind the joint as well as the panel. He stated that fire tests on building materials are conducted regularly at the Underwriters' Laboratory, the National Bureau of Standards, University of California, and Ohio State University.

An interesting sidelight mentioned by Terry was that he had heard of several instances where restrictive building codes were successfully bypassed by incorporating regular window sash throughout the exterior of a building, and then inserting metal panels in the sash.

Male and Terry, as steel company representatives, both took part in the next portion of the session — describing the "Interests of Metal Producers in Sandwich Panel Construction". Both as individual companies and collectively, much time and effort has been spent in the last eight to ten years in the development of greater acceptance of curtain wall construction by steel companies and, more recently, by the aluminum companies. Architects and engineers want and need technical information such as details of connections, details of frameworks, information about the water-tightness of joints, how panels are assembled and other vital information. Recognizing this, manufacturers are not providing "beautiful renderings of buildings that have been erected or are on the architects' boards", but instead are providing practical, usable data about curtain wall construction that will be of the most value to architects, engineers, owners and others in the building field. The porcelain enamel conference was told that there are several organized development and research groups with whom they can set up liaison, and cooperate with, to the end of further market development. →

Male said U.S. Steel is promoting metal-clad buildings with architects and owners by placing in their hands information on the details of curtain wall panels, trim, joints, etc. The objective is to influence the architect or owner *before* his job is detailed—so that he will be pre-disposed to include the curtain-wall design in his plans.

Proceeding into the Test Methods and Specifications part of the program, a guest speaker at the meeting was Dr. E. W. Kuenzi, of the Forest Products Laboratory, Department of Agriculture. Dr. Kuenzi described the work of the American Society for Testing Materials' Committee C-19, the Sandwich Panel Construction Committee. It was announced that E. F. McDonald, of Ingram-Richardson Mfg. Co., and Edward Mackasek, managing director of the Porcelain Enamel Institute, have become members of Committee C-19 and are planning to actively participate in its work.

The subject of Test Methods and Specifications was further pursued with coverage of these three topics: Weatherability of Porcelain Enamels — Continuing Correlation Studies; Standards and Specifications for Architectural Porcelain Enamel; Specifications and Tests for Porcelain Enamel Curtain Walls.

An administrative meeting of the Architectural Division took place, attended by PEI members who manufacture architectural porcelain enamel. Following this session, PEI's president, Glenn A. Hutt, of Ferro Corporation, stated, "Our Architectural Division is now better organized to handle its problems and approach its great potential markets than at any time since its inception.

CENTRAL ENAMELERS DISCUSS LOW TEMP. COATINGS

A NEW major source for iron ore and new types of low temperature ceramic coatings were the subjects for a meeting of the Central District Enamelers Club, held at the Manger Hotel, Cleveland, February 4.

Karl Fetters, assistant to the vice president — mill research, Youngstown Sheet & Tube Co., with others from the Youngstown organization, presented two color-sound movies under the subject, "Ore Development in Labrador." These interesting and colorful movies gave some little idea of the hardships and difficulties involved in the opening of the fabulous new ore source and the establishment of rail transportation for delivery to water carriers.

A new series of low temperature coatings, termed "Porcenell," were described by Fetters, of Youngstown, and Joe Irwin, of Promat Division of Poor & Co. The new series of corrosion-resistant coatings will presumably be offered in ranges of curing temperature from 600°F. to 1200°F. The first series to be offered will probably be in the 1050° to 1250° range.

Samples were displayed representing 3 mils thickness on shot blasted hot rolled sections and cured at 1000°F. Other samples were on pickled nickel-dip samples on heavy gauge with two to three mils undercoat and two to three mils cover. The first coat was cured at 1200°F. and the second coat at 1150°F.

Other samples were on 29 gauge steel corrugated sections, in colors. 60,000 pounds of corrugated sheet is currently being coated for installation on Youngstown Sheet & Tube mill buildings. The material is indicated as a replacement for galvanized steel, offering improved corrosion resistance. The life is indicated as more than ten times that of galvanizing, on the basis of laboratory tests.

For Youngstown buildings, commercial quality cold rolled is being used and represents 20 and 24 gauge corrugated. About three-fourths of the sheets are coated with one coat to replace conventional materials now in use. One-fourth of the sheets will be in two coats for improved appearance and to test for severe use.

No whites are available at present in the new coating. Pastel colors and darker colors are offered, and it is reported that at least two architectural porcelain manufacturers are licensed to use the finishes.

Dr. Fetters clarified the company interest by stating that "Vitreco" represented a patent-holding and research company in which both Poor & Co. and Youngstown Sheet & Tube are interested. "Allied Porcenell" is a sales company for licensing, merchandising and selling the coatings.

The next meeting of the Central District Enamelers Club is scheduled for Columbus, Ohio, at the new Westinghouse refrigerator plant. It will be held on Friday, May 6. Business will include election of officers.

MIDWEST GROUP HEAR OF PLATING PROBLEMS

AT THE January 29 meeting of the Midwest Enamelers Club, held at the La Salle Hotel, in Chicago, George P. Swift, of Electrochemical & Spectrochemical Laboratories, Watertown, Mass., gave the enamelers in attendance some idea of the cleaning and finishing problems encountered in the electroplating industry.

Swift gave some case histories for trouble shooting in plants where plating is done on a large scale. Following the talk, there was a discussion of cyanide baths, waste disposal, etc.

Charles Lohman, of Pemco Corporation, Baltimore, Md., then presented some thoughts on the subject of ceramics as a hobby. He described the equipment used by the ceramic hobbyist, and illustrated with samples some of the work of amateur ceramists, and illustrated how some of these hobbies have grown into worthwhile businesses.

The next meeting of the club will be held in Milwaukee, March 25. The afternoon will be devoted to a tour of the A. O. Smith Corporation plant where the enamelers will see how large glass-lined tanks are produced. Later the group will go to the Miller Brewery where the use of the tanks will be demonstrated.

here are the facts about **HOMMEL**

HOT WATER TANK ENAMELS

and what they mean to you...

BETTER WORKABILITY

The better workability of Hommel Frits has been demonstrated in enameling shops on a world-wide scale. This better workability is especially applicable in Hot Water Tank Enamels.

BETTER RESISTANCE TO ALL WATER CONDITIONS

The success of Hommel Hot Water Tank Enamels is due largely to their superior resistance to most corrosive waters found throughout the country.

BETTER SELLING FEATURES

Better selling features include better-performance, a longer-lasting tank and all the desirable properties that glass-on-steel protection offers.

INCREASED PROFITS

Lower costs are a reality with versatile, workable frits that enable you to combine high production with assured uniformity . . . and without changing production facilities or increasing costs.

GET ALL THE FACTS

For 64 years we've been helping Ceramists throughout the world improve their products. Our sound knowledge of the enameling business and the ability to translate this knowledge into each individual enameling function, is one of the many reasons more and more enamelers are turning to Hommel for facts.

Sales representatives throughout the world

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POTTERY • STEEL AND CAST IRON FRIT
CERAMIC COLORS • CHEMICALS • SUPPLIES

Our Technical Staff and Samples are available to you without obligation. Let us help with your problems.

"The World's Most Complete Ceramic Supplier"

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FLASH...

GILRON'S DRAWCOTE JOINS PENNSALT'S FAMILY OF METAL PROCESSING CHEMICALS! THE PURCHASE OF GILRON PRODUCTS CO. BY PENNSALT MEANS A FULL LINE OF DRAWING COMPOUNDS, METAL CLEANERS, PHOSPHATIZING COMPOUNDS WITH SERVICE FROM ONE SOURCE.

Pennsalt announces an important addition to its growing line of specialty chemicals and services to the metal working industry . . . the Gilron Products Company of Cleveland, Ohio. All Gilron personnel will continue to be active under the new management.

Established in 1942, the Gilron line features "Drawcote," a dry soap type of drawing compound which, when applied to metal, makes additional lubrication unnecessary before drawing, stamping, forming or cold extrusion.

Pennsalt, by adding Gilron and Drawcote, now has a product line that can serve all types of stamping and drawing shops with new and superior lubrication methods. Drawcote can be used alone for lighter duty draws.

It can also be used with Pennsalt Foscoat for severe draws and extrusions. Yes, Pennsalt now has a complete range of products to fit exactly the needs of most steel stampers and formers.

Remember, Pennsalt's Drawcote and Fos Process give you—

- Cleaner shop conditions!
- Fewer rejects from tearing or scoring!
- Longer die life!
- Better finish on parts!

Call your Pennsalt metal processing specialist for full details. Write Customer Service Dept., Pennsylvania Salt Manufacturing Company, 1063 Widener Bldg., Philadelphia 7, Pa.

Pennsalt Chemicals

SPECIALISTS IN METAL SURFACE PREPARATION

Hot process screening colors for porcelain enamel

a report on a process resulting from development of thermoplastic mediums

by Robert G. King • THE VITRO MANUFACTURING COMPANY, PITTSBURGH, PENNSYLVANIA

THIS article describes a method of squeegee application for use in the porcelain enameling industry. The process is made possible by the use of thermoplastic mediums. These mediums are solid at room temperature, but at increased temperatures the medium becomes fluid. This method has now been proven successful in the glass industry at a working temperature of 160°-200° F. This screening paste is heated to this temperature and screened on the porcelain enamel where it immediately solidifies.

Advantages

This process is not being used at the present time in the enameling industry, but I believe that from initial trials that this can be accomplished. It offers the following advantages:

1. Eliminates drying the first screen application before applying second color, or for the second and third colors, thus saving time and labor.
2. Eliminates rejects due to smeared prints on handling.
3. Details of design are sharper. There is no tendency of colors bleeding, giving ragged designs.
4. Better control of application weight of screening colors, since this medium does not depend on the addition of color for viscosity.

It is possible to apply three to four colors superimposed by this method. In a two-color screening application, the second color can be applied in the conventional color squeegee oil over the hot process first color. In this case, it will require only one set-up for hot process application.

The disadvantages of this process are as follows:

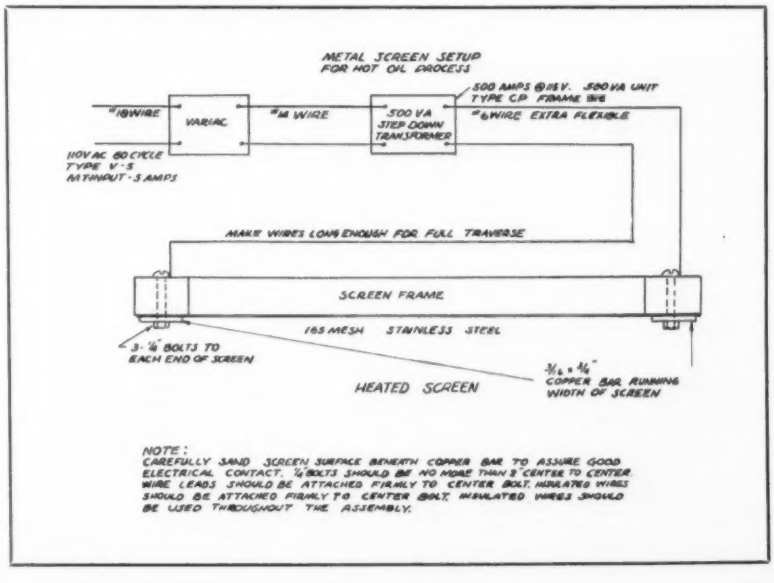
1. Cost of the screens will be greater, due to the fact that for satisfactory results 165-mesh metal screens are required which are more expensive than silk or nylon screens.
2. Screen design must be changed to take care of the expansion of the metal at operating temperatures.
3. The screens definitely will be limited to a small size. Preliminary investigation show that we can use screens 18″ to 24″.
4. Personnel using this material must be instructed on its use to prevent serious burns.

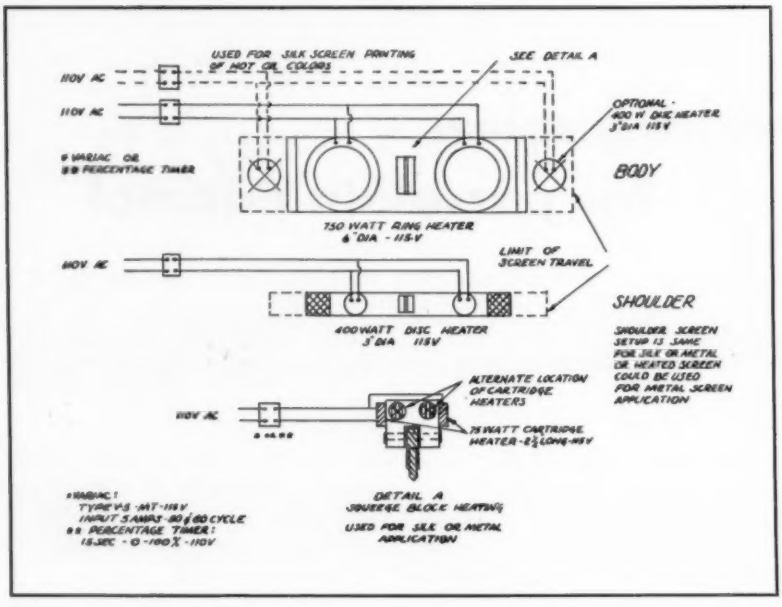
Our experience with the thermoplastic mediums has proved that this material is quite stable. After storage of several months there have been no deleterious effects.

It is necessary to pre-heat the paste slightly above the working temperature to using it in the screen. The equipment used for this purpose is a jacketed container which is thermostatically controlled.

Heat application

Various means of providing heat to the color on the screen during operations can be used. Disc-type radiant heaters have proven fairly satisfactory for metal screens, and, to a limited extent, silk screens. These should be arranged so they radiate heat to the screen and also to the squeegee block holding the squeegee rubber, which has a tendency to run cold and thus accumulate frozen color. The use of auxiliary resistance heaters with separate electrical controls in or on the squeegee block has proven very satisfactory when used with one of the other heating systems.


METAL SCREEN SETUP
FOR HOT OIL PROCESS
500 AMPS @ 115 V. 500 VA UNIT
TYPE CP FRAME 1116
#18 WIRE
VARIAC
#14 WIRE
500 VA
STEP DOWN
TRANSFORMER
#6 WIRE EXTRA FLEXIBLE
110 VAC 60 CYCLE
TYPE V-5
MAXIMUM-5 AMPS
MAKE WIRES LONG ENOUGH FOR FULL TRAVERSE
SCREEN FRAME
165 MESH STAINLESS STEEL
3-1/4" BOLTS TO
EACH END OF SCREEN
HEATED SCREEN
3/16 x 3/4"
COPPER BAR RUNNING
WIDTH OF SCREEN
NOTE:
CAREFULLY SAND SCREEN SURFACE BENEATH COPPER BAR TO ASSURE GOOD
ELECTRICAL CONTACT. 1/4" BOLTS SHOULD BE NO MORE THAN 2" CENTER TO CENTER.
WIRE LEADS SHOULD BE ATTACHED FIRMLY TO CENTER BOLT. INSULATED WIRES
SHOULD BE ATTACHED FIRMLY TO CENTER BOLT. INSULATED WIRES SHOULD
BE USED THROUGHOUT THE ASSEMBLY.


USED FOR SILK SCREEN PRINTING OF HOT OIL COLORS
SEE DETAIL A
110V AC
110V AC
OPTIONAL - 400 W DISC HEATER 3" DIA 115 V
VARIAC OR % PERCENTAGE TIMER
BODY
750 WATT RING HEATER 6" DIA - 115 V
LIMIT OF SCREEN TRAVEL
110V AC
SHOULDER
400 WATT DISC HEATER 3" DIA 115V
SHOULDER SCREEN SETUP IS SAME FOR SILK OR METAL OR HEATED SCREEN COULD BE USED FOR METAL SCREEN APPLICATION
ALTERNATE LOCATION OF CARTRIDGE HEATERS
110V AC
75 WATT CARTRIDGE HEATER - 2½ LONG - 115 V
VARIAC : TYPE V-5 : MT-115 V INPUT 5 AMPS - 60 ∮ 60 CYCLE
% PERCENTAGE TIMER : 15 SEC - 0 - 100 % - 110 V
DETAIL A SQUEEGEE BLOCK HEATING
USED FOR SILK OR METAL APPLICATION

25-watts for each inch of squeegee rubber is recommended for each side of the squeegee holder. The use of metal screen as a heating resistance is also practical and details concerning this application will be discussed later. Variable potentiometers are recommended to control the elements being used. Interval timers may also be used with radiant-type heaters.

There are certain precautions which should be taken when using the thermoplastic media to obtain best results.

The clearance between the screen and the ware being decorated is extremely important when using thermofluid mediums. If sufficient clearance is not maintained, the color will freeze in the mesh of the screen and pull away from the ware being decorated. This can easily be recognized as the ware being decorated will show a waxy film where the design should be.

It is also important to keep cold drafts of air away from the screen to prevent chilling the color.

The squeegee should never be allowed to rest on a previously printed color, even for a fraction of a second. The start and end of the printing stroke must be a smooth movement. The heat and pressure of a stationary squeegee rubber on a previously printed color will re-melt and distort the color. Speed of printing can eliminate this.

Mis-prints can be removed by scraping with a palette knife and then wiping the remaining waxy film with solvent. This method is impractical for production scale operations, and a washing machine is recommended. A hot (190 - 210° F.) solution of 2% trisodium phosphate or tetrasodium phosphate and 1, 2, or 3% sodium hydroxide is recommended to be followed by a clear water rinse. Nylon brushes in the washing solution will increase the efficiency of this system.

Screens may be cleaned in the same manner as screens using conventional air-dry mediums, except that large areas of cold thermofluid colors are difficult to remove due to slow solvent action. Large amounts of thermofluid colors can be removed best by scraping while the color is still fluid.

It is sometimes satisfactory to allow the color to thoroughly harden and then it can often be peeled from the screen. Final cleaning is then done with solvents that will not attack the screen.

Following are specifications of equipment that will perform satisfactorily, and are presented only as a guide for equipment required:

Disc (ring) heaters: 6 inch diameter, 750 watts, 115 volts—2 required for average body screen; 3 inch diameter, 400 watts, 115 volts — 2 required for average shoulder screen.

Cartridge heaters: 2½" long, 75 watts, 115 volts—2 required for optional squeegee block heating.

Interval percentage timers: 15 second interval, 0-100%, 110 volts—1 required per screen.

Variable transformers: 115 volt, input 5 amps, 50-60 cycle.

Special transformer: (a) 50 amps at 11.5 volts; (b) 50 amps at 10 volts.

Insulating tape.

Adapted for *finish* from a presentation before the 15th annual forum of the Porcelain Enamel Institute.

Industrial buildings go modern

(Continued from Page 37)

to strong, moisture-carrying winds and salt air. And as the location of the plant is in the much-frequented tourist area of Morro Rock, pleasing appearance was considered essential.

The company's engineering department, in collaboration with William Gladstone Merchant, San Francisco architect, planned the architectural design and finish with these factors in mind.

PG&E executives stress that the company's move towards modern design is also due to its realization that the electric industry "typifies and largely engenders modern living and should exemplify it". Sutherland points out: "Functionally, our new installations are as modern as tomorrow."

One of the most recently completed PG&E buildings, which brings 110,000-volt power into the heart of downtown San Francisco, completed in 1950, was selected as one of the ten 'noteworthy' examples of San Francisco downtown architecture by the Northern California Chapter of the American Institute of Architects.

The Morro Bay plant will be in partial use during 1955 with completion of the first of its two 150,000 kilowatt units. The second is scheduled for operation in 1956.

a fellow worth talking to . . .

If you are interested in fewer rejects and lower costs in your porcelain enameling operations!

If your rejects are lower than the average . . . and . . . you have lower than average costs in your porcelain enameling operations . . . THEN . . . don't waste your time reading farther.

HOWEVER—IF YOU NEED HELP . . .

we think we have the answer for you. Here at Ing-Rich, through the years, we have not only owned and operated one of the largest job enameling plants in the country, but for more than a half-century, we have produced our own frits.

ING-RICH FRITS ARE PLANT TESTED!

Laboratory tested . . . yes! Plant-tested . . . yes! Service engineers with just laboratory experience . . . NO! Our service engineers must go through the laboratory and then go through the practical end of our business . . . in our own job enameling plant.

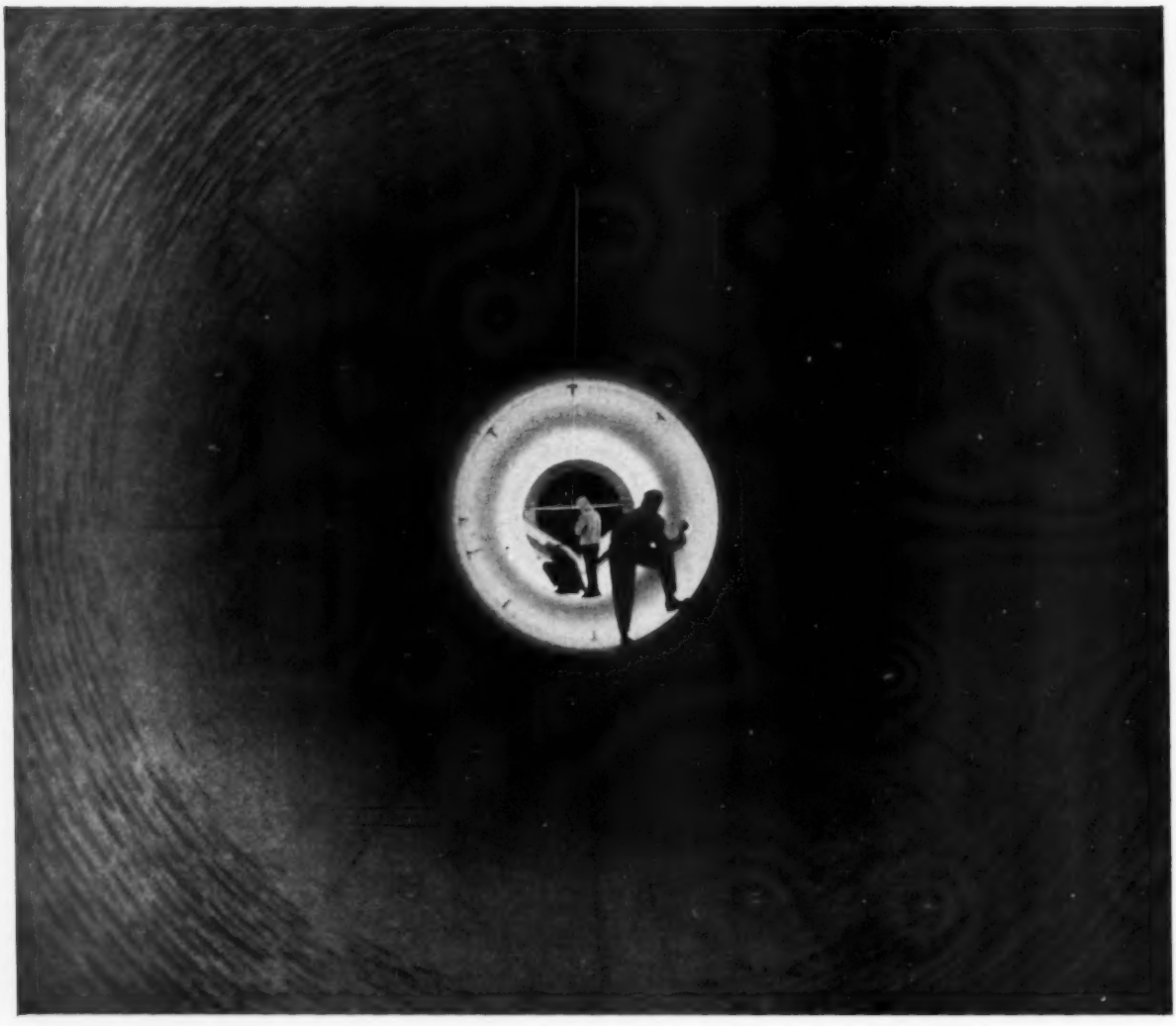
That's why, when one of our service engineers comes to your plant, he brings you the "works" . . . laboratory research *plus* old man experience.

A FELLOW WORTH TALKING TO . . .

Write today and a plant tested Ing-Rich Service Engineer will call on you in the early future, without obligation. And, when he calls on you, hear him through. You *MIGHT* get fewer rejects and lower costs in your porcelain enameling operations.

INGRAM-RICHARDSON, INC.
OFFICES, LABORATORY AND PLANT • FRANKFORT, INDIANA

ING-RICH
FRIT
"The Plant Tested Frit"



bull's-eye for quality

The huge calciner shown here is just one part of the TITANOX quality story. In this mammoth rotary kiln, titanium hydrate is converted to titanium dioxide. It is one of the last steps in a carefully controlled process which yields the uniformity of composition, easy working qualities, low shrinkage and free flow which are characteristic of TITANOX-TG and TITANOX-TG-400—non-pigmentary titanium dioxides made exclusively for ceramics.

Smelted into titania porcelain enamels, TITANOX-TG produces maximum opacity while TITANOX-TG-400 yields a blue-white tone. Recent research indicates that glazes can be self-opacified by titanium dioxide through the use of TITANOX-TG. Further, TITANOX-TG is invaluable in promoting acid resistance in dry process enamels as well as enamels for aluminum and glass decorating. Both the anatase and rutile types of TITANOX titanium dioxide pigments are widely used as mill-added opacifiers.

Your TITANOX representative and our Technical Service Department are always ready to help you make the proper choice. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Atlanta 2; Boston 6; Chicago 3; Cleveland 15; Houston 2; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 14, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

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brightest name in the finish

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

New Processes for Industry

APPLICATION OF VITREOUS ENAMEL TO ALUMINUM CASTINGS

APPLICATION of vitreous enamel to aluminum castings has been announced by Monarch Aluminum Mfg. Co., of Cleveland, Ohio, which expects this development to expand the market for the use of aluminum castings in many industries.

Adds color appeal

In addition to providing added surface protection, this achievement now adds dramatic color appeal to aluminum castings, reports R. A. Lawson, Monarch's vice president of sales.

"Enhanced color appeal," according to Lawson, "can add sales drama to many products. Through the use of inert pigments, light-fast colors retain their beauty, resistant to stain and discoloration. A wide range of vitreous colors are now at the command of engineers when designing products to utilize the full advantage of aluminum castings."

Excellent resistance to thermal shock, salt water corrosion and abrasion has been achieved, state engineers of Monarch Aluminum's vitreous enamel engineering division, following completion of 15 months of development in the application of vitreous enamel to aluminum castings.

Having a high electrical breakdown rating, the vitreous surface coating is said to make the castings ideal for applications where insulating and shielding properties are desired.

As enameled surfaces can be used for thermal insulation and since aluminum is known for its excellent heat conductivity, it is pointed out that the surface coating can thus be used to control heat distribution.

Aids fabrication of castings

Another apparent advantage of the vitreous enamel finish is found in the fabrication of finished castings. Parts may be machined without serious damage to the surface. Component assemblies can be welded after finishing, within the weldable limits of the casting, without undue damage or discoloration to the enamel coating.

Some of the basic problems surmounted by engineers working on this development were the control of casting deformity under firing temperatures, the employment of low melting-point frits especially engineered for aluminum, and a remarkably improved resistance to shock, impact and stress.

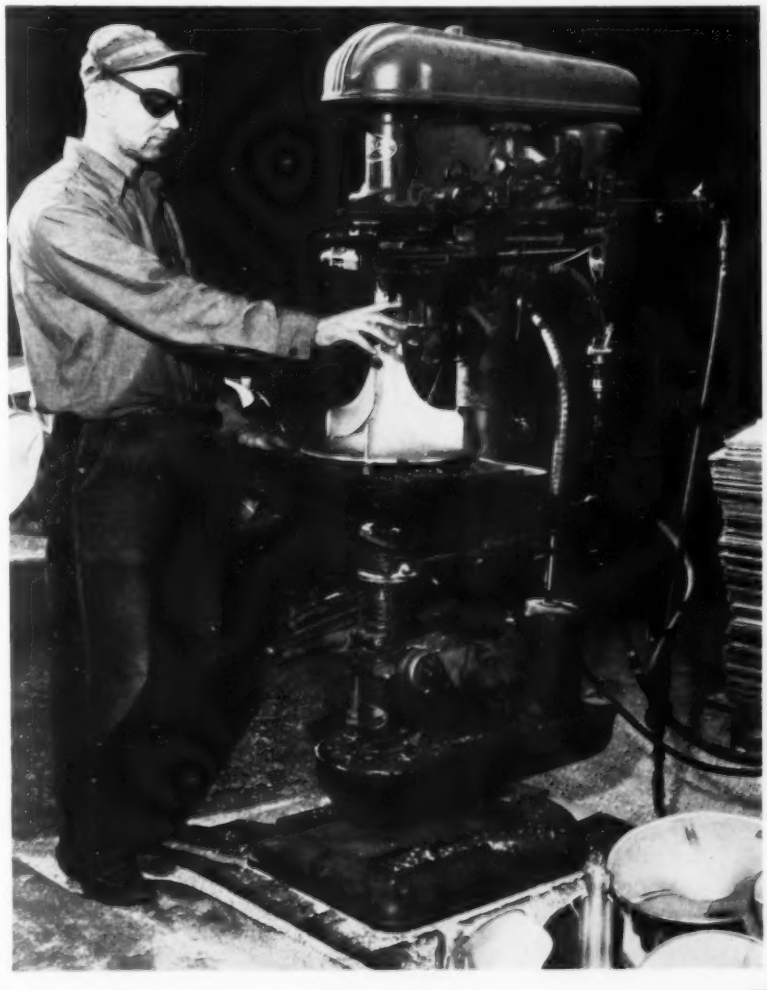
Monarch Aluminum stated that experience gained by DuPont and Ferro in the processing of vitreous enameled aluminum sheets served as a background to their research.

Pilot facilities have proved successful in this operation, and production facilities are now in the development stage at Monarch Aluminum's plant.

DOUBLE-DUTY MACHINE INCREASES OUTPUT OF WASHING MACHINE AGITATORS

THE application of inexpensive power tools — performing two machining operations in one operation — has enabled MetaMold Aluminum Co., of Cedarburg, Wis., to maintain production at a high level.

Two 16-inch drill presses, one inverted below the other, are used for machining a washing machine agitator. A reduction gear decreases the drill speed for this operation. At the same time, the top drill press flycuts the agitator post to bring it down to the desired height. The cycle is fully automatic, MetaMold engineers say, and gives excellent results.



finish SUGGESTION BOX

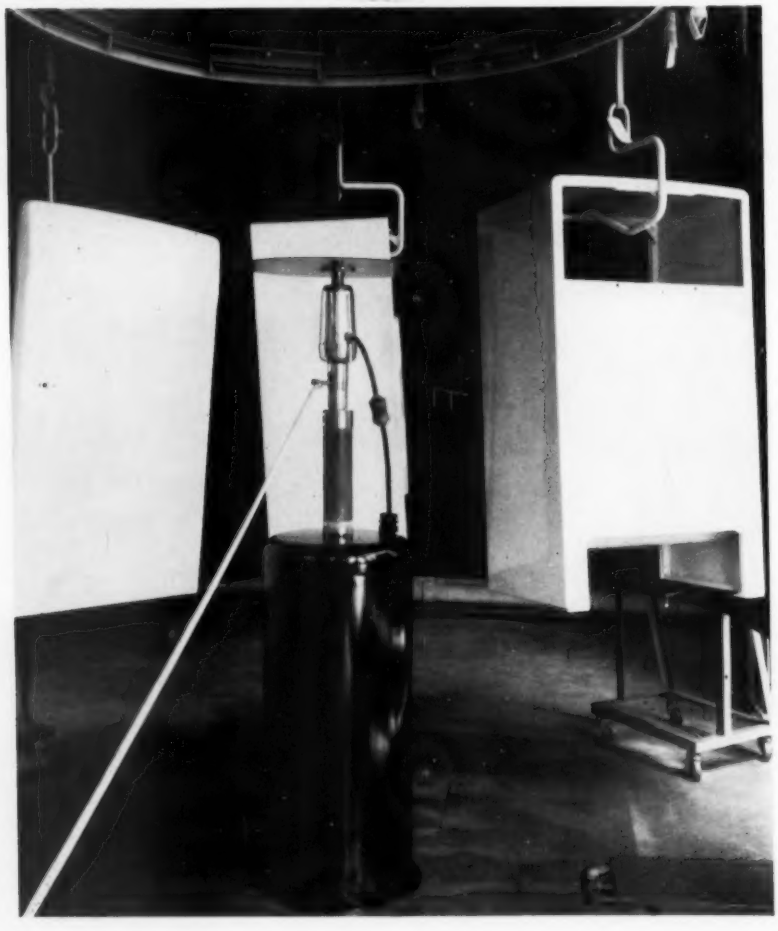
Reciprocating, disc-type atomizer for electrostatic finishing

A new disc-type atomizer, which features an up-and-down motion, provides for more flexibility and versatility in electrostatic spray finishing of appliance cabinets and other metal products.

Parts are hung on a conveyor which makes a circular loop in the electrostatic spray area. The reciprocating disc atomizer is located in a pit in the floor (or mounted overhead) in the center of the loop.

Paint is pumped to the center of the disc which rotates to feed paint to the atomizing edge. High d.c. voltage (usually around 90 k.v.) is imposed on the disc, establishing an electrostatic field between the disc and the parts hanging on the grounded conveyor. This atomizes the paint into a fine spray and electrostatically attracts it to the surrounding parts.

With refrigerator whites, up to 2 mils are applied with one loop in the paint area. Atomizer is shown here near the top of its stroke.



The reciprocating disc-type atomizer does not require precise positioning of parts in relationship to the atomizer. Tests show the reciprocating unit will tolerate a 10″ to 24″ difference with practically no spray pattern problem. A single 25-inch disc is said to be capable of atomizing five times as much paint as one atomizing bell of a triple-head unit.

The disc permits the application of a uniform coating with one pass in the spray area. With refrigerator whites, up to 2 mils are applied with one loop in the paint area. Objects to be painted may get twenty-five 60″ strokes which is comparable to a number of passes in the painting area. Different reciprocating speeds may be automatically controlled within the stroke.

Within broad limits, various sizes may be painted with excellent results. For instance, refrigerator sizes varying from 55″ to 66″ and from 24″ to 30½″ in width may be painted with excellent uniformity. Also, in handling parts of various vertical dimensions, it is easy to change the length of the stroke "on the fly" without slowing up production. Changes can be made by merely pressing a button without shutting down the production line.

Parts already successfully painted with the reciprocating disc-type atomizer (on production lines as well as in laboratory test runs) include water heater jackets, refrigerator cabinets and door liners, furnace panels and grilles, ironing boards *(see June 1954 finish)*, ventilating fans, washing machines and dryers, steel drums, shower stalls, wire screen, air filters, fluorescent fixtures and automobile hoods and fenders.

Source for more information on this reciprocating disc-type atomizer may be obtained by writing to finish.

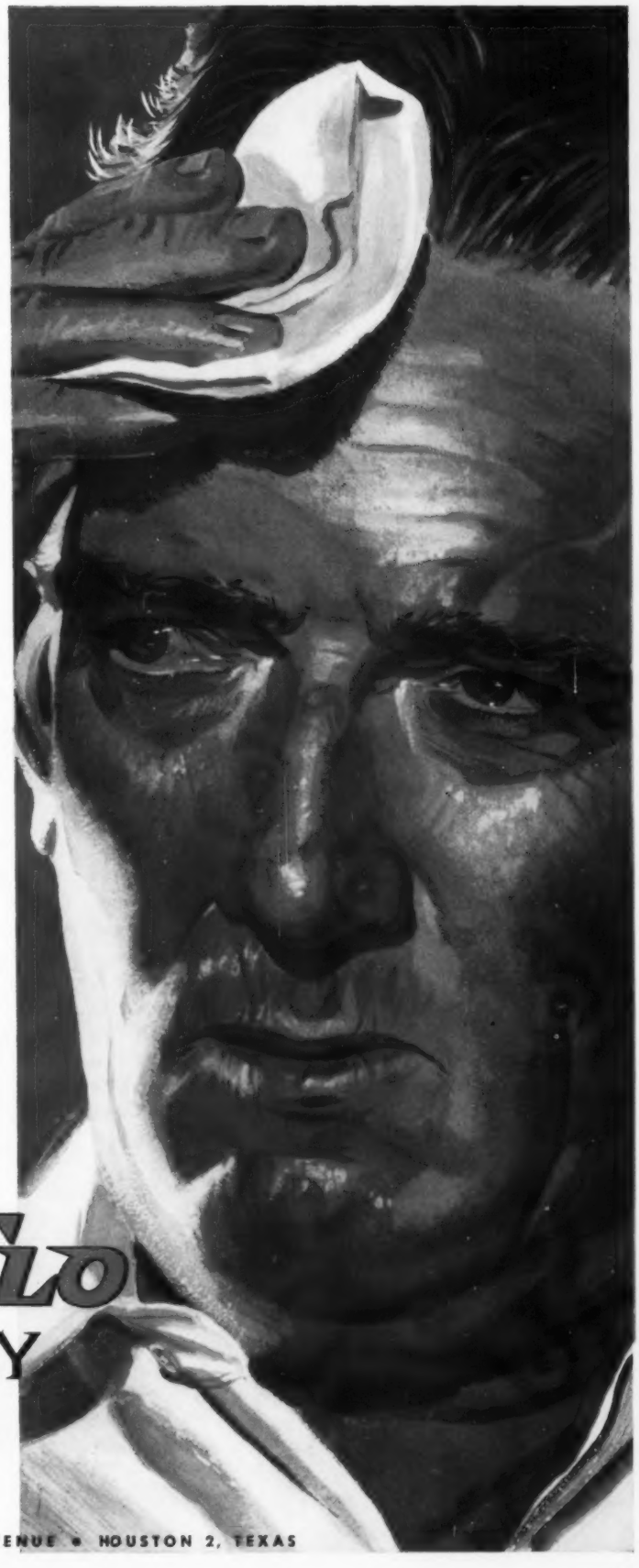
is your finishing department giving you a headache?

- Are rejects throwing your costs out of line?
- Are time and material costs eating up your profits?
- Are you getting consistent finishing room quality control?
- Are you satisfied with the appearance of your finished product?

Paint department headaches will disappear with Spee-Flo Hot Spray Heaters. Production costs will drop and consistent, all-weather quality control will be established.

We'll be glad to show you facts and figures on how other manufacturers in your field are producing better products at lower cost. Spee-Flo Hot Spray Heaters pay for themselves in the first few weeks of operation . . . they are long lived and trouble free.

LET US GIVE YOU AN ON THE JOB DEMONSTRATION



SPEE-FLO

HOT SPRAY HEATERS

SPEE-FLO CORP. 720 POLK AVENUE • HOUSTON 2, TEXAS

Compressed air power

→ *from Page 30*

ensue if pressure goes above 110 psi. Power loss can materially affect production output. For instance, it was found that a typical tool could produce 18 parts at 90 psi but only 14 when air pressure dropped to 70 psi.

One of the most revealing aspects of the survey were the pronounced effects which fittings and hoses had upon tool performance. This installation uses 3,000 quick-disconnect type fittings which should be inspected at regular intervals. After months of service the rubber washers and metal valves in them can become worn and greatly restrict air passage. Their effect on tool operation is shown in the following list of tests:

Percentage of tool efficiency

Line PSI	*With old valve and washer*	*With new valve and washer*	*Percentage efficiency increase*
95	48%	100%	108%
98	80%	100%	25%
95	6%	90%	1,400%
100	27%	88%	225%
102	5%	100%	1,900%
*80	25%	56%	124%
*85	41%	56%	36%

*Low line pressure

By specifying the best type of fittings, these losses can be held to a minimum. The pressure drop through a good quick-disconnect fitting and valve is only 3 psi or 5 percent in tool efficiency.

A number of instances of power loss due to improper size and length of hose used were uncovered by the study. The smallest inside diameter rubber hose recommended by air tool manufacturers is 5/16". Often 1/4" hose sizes are used, and no consideration is given to lengths employed. Tests proved that as much as 1 psi per foot of hose is lost when diameters are slightly undersize. In some cases it was found that 25 feet of hose were used to serve a work station only 6 feet from the air outlet. A gain of 2 psi was made by merely uncoiling such hose.

A typical situation which can occur is one in which a 1/4" hose from an air outlet is plugged to a hose of larger diameter which, in turn, is connected to two or more whip hoses for tools. Here the capacity of every tool is limited by the first undersized hose and further reduced by the lengths and multiple fittings used. In such a case, tool efficiency was increased 42 percent by merely removing the first hose. Examples of the gains made by substituting 3/8" diameter hose for 1/4" are shown in the following test tables:

Line PSI	*Tool Efficiency* ¼" I.D.	Length	*Tool Efficiency* ⅜" I.D.	Length	*Percent Increase*
106	76%	12′	100%	12′	31.5%
94	33%	20′	92%	12′	178.7%
94	49%	14′	92%	12′	87.7%
98	46%	14′	90%	12′	95.6%
94	67%	8′	92%	12′	37.3%
100	36%	15′	100%	12′	177.7%

Basically, main compressed air lines were found to be adequate, but branch lines were sometimes improperly arranged. For instance, it was found that 3/4" diameter overhead plug strips were fed by 1/4" branch lines. In one case a greatly extended branch line was feeding 34 outlets, even though another source of air was close at hand. A common practice was to take the tool outlet from the bottom of the feed pipe, tending to make a water trap out of the outlet.

"Pigs" aid distribution when properly used. A good many manifolds, or "pigs" are used which consist of a short length of 3-inch diameter pipe with a main inlet in one end plate and a drain cock in the other. Six fittings are installed in the barrel to serve tools. Tests showed that these "pigs" could function efficiently when connected to branch lines through 3/4" hose and 1/2" pipe fittings. Without proper supervision these units are often converted, so that they do not meet these requirements. Sometimes the drain cocks are removed and a plug or another air fitting is inserted in its place, so that they cannot be drained.

As a direct result of the study Ryan has standardized on the use of Hansen fittings and 3/8" diameter hose lines of the shortest possible run to each work station. All fittings are inspected at regular periods and worn valves and washers replaced. Tapered valves have been replaced with square shoulder valves which permit an average of 14 percent more air to pass. Care is taken to see that not more than 10 Hansen fittings serve a 1/2" pipe inlet and hook-ups are distributed in as balanced a manner as possible. "Pigs" are served with proper sized hose, and fittings and drain cocks are provided.

These steps have increased tool power as much as 200 percent and have made more compressed air available to the plant. This may sound paradoxical in view of the fact that larger air lines require more air to keep them supplied. As a matter of fact, methods engineers estimate that it takes 35 percent more compressed air to fill the system now because of the enlarged hoses and fittings. However, with full power at each tool the production jobs are accomplished in a fraction of the time formerly needed, with the result that more air power is available to the plant.

AIR SOURCES

Four compressor stations provide the necessary compressed air. Five compressors are used to develop 3600 cubic feet of air a minute at 100 psi. The survey showed that this air entered the main lines of the plant at a temperature of 100°F. As it coursed through the plant and into the hand tools, it cooled, and moisture in the air condensed within the system. This water caused rust which flaked off and was blown into the tools. The moist, dirty air entering the tools removed the lubricants and in-

How does the specially prepared surface texture of USS VITRENAMEL Sheets benefit appliance manufacturers?

USS VITRENAMEL Sheets form a permanent, tight bond with the enamel that assures maximum adhesion.

See "THE UNITED STATES STEEL HOUR"—Televised alternate weeks—Consult your newspaper for time and station.

PORCELAIN ENAMEL ON *USS Vitrenamel* BASE

USS

UNITED STATES STEEL CORPORATION, PITTSBURGH · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

troduced foreign abrasive matter which contributed to excessive maintenance costs.

By improving the design and use of water trapping facilities, this undesirable condition was improved. However, the survey recommended that steps be taken to remove the water from the air before it entered the distributing system. This has been done at one compressor station and is being planned for the others. An air drier has been installed to remove the water content from the air.

Basic benefits which a plant survey and newly created procedures produced:

1 — A desirable decrease in the cost of repairs to 4000 air-operated hand tools.

2 — A marked increase in the efficiency of the tools resulting in faster, better work and equivalent to increasing the work force.

3 — An extension in the life of $300,000 worth of tools.

4 — A stepped up availability of pneumatic tools due to better service and reduced periods of out-of-service equivalent to raising the number of such tools.

5 — An increased availability of compressed air power within the plant equivalent to installation of added facilities, important where usage is close to compressor capacity.

Designing tomorrow's appliances

(Continued from Page 25)

abandoned in favor of ground floor utility rooms which again are often a part of the kitchen. While everyone would *like* a nice looking washer or dryer in the basement, it is *imperative* that it be so when it is placed on the first floor.

Play or recreation rooms have moved out of the basement (who really wants to entertain his friends in the cellar) and the equipment for this type of living must be made more convenient. Such things as portable grilles, ovens on wheels and numerous other similar appliances are finding daily use in this kind of situation.

4. *Decline in the use of extra help* — Almost none but the upper income group has living-in help today and daily-help families are decreasing. This means that more and more emphasis will be placed on added convenience and usability of all appliances. The housewife, doing more of her own work, will want to be at the party while mashing the potatoes and she would really like a "bottomless pit" in which to put the dishes after dinner is over. The kitchen, becoming more nearly a part of the rest of the house, must be considered as more than the sterile looking laboratory sheathed in white which has been its tradition. Incidentally, Frigidaire's introduction of color in home appliances is a striking example of what can be accomplished in this direction. Why should today's kitchen be deprived of the pleasure of color so enjoyed by every other element of the household.

Then, too, outside interests are more and more frequently attracting the housewife, and for this reason too she is demanding more and more of each of her appliances. I suppose a completely automatic kitchen would be none too much for some harried matron who worked on the P.T.A. board in the morning, went to the hairdresser after lunch, went to a bridge tea in the afternoon and hurried home to prepare the family evening meal for her tired husband.

Costs and the consideration of them must also enter here. After all, no appliance will be successful if it fails to be priced right for the market in which it is intended to be sold.

5. *New engineering principles* — We are on the threshold of many new engineering triumphs related to the everyday tasks of the household and these new wonders must be translated into new equipment which will further lighten the work of all of us in our daily tasks. The field of electronics offers almost limitless avenues of development as we look into the future, and it is certainly safe to think that hardly any of today's household appliances will even remotely resemble those of ten years from now. As I said before, mechanical, electrical, chemical, physical and many fields of development offer vistas of new things to come.

How then do we go about translating the influence of these first two areas into finished products for all of us? We start all our work with a careful analysis of all governing factors. If it is a new refrigerator we intend to work on, we establish every good and bad point of the existing ones, ours and our competitor's. We get any new developments from the engineers; we get the package size and special features from our field forces, both point of sale and research. We add our own innovations, and only then are we ready to start. Of course, the first work is by means of sketches, finished perspectives, full size layouts, and full size mock ups. This work serves to crystallize our own thinking and makes it possible to have the benefit of early consultation with engineering, manufacturing, and sales. Everyone concerned has an opportunity to contribute at these early stages. When a basic design direction is achieved, we then model in clay at full size.

The importance of full size models

The uninitiated may find it difficult to appraise the value of various elements of design when modeled in clay but our experienced and practiced eye can evaluate the effect of the various forms and shapes which are to be employed. The great flexibility of this medium is a tremendous advantage at this point for mouldings can be changed, sizes altered and proportions reconsidered. At this stage the design is worked out in great detail. Great care at this point means less trouble in the final model stage. Again, this stage gives the engineers and production men a chance to consider forms with relations to structure and to determine how the final article will be produced. Sales also gets a chance to see package

DOW CORNING CORPORATION

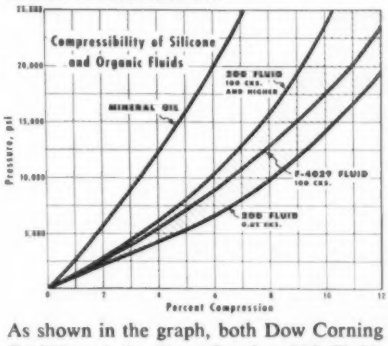
Silicone News

FOR DESIGN ENGINEERS

DESIGNERS USE SILICONE FLUIDS FOR MORE EFFICIENT SPRINGING

Dow Corning silicone fluids have always been noted for their thermal stability and their remarkably flat viscosity-temperature slopes. They have, therefore, been widely used as damping media in such devices as dashpots, overload relays and torsional vibration dampers for crankshafts.

More recently, designers have found that certain silicone fluids, Dow Corning F-4029 and some Dow Corning 200 Fluids, also have high compressibility. Using these fluids, engineers have produced liquid springs and shock absorbers with the same capacity as much larger and heavier metal coil springs. Testing indicates these highly compact liquid springs retain a high order of efficiency even under constant recycling at milli-second intervals.



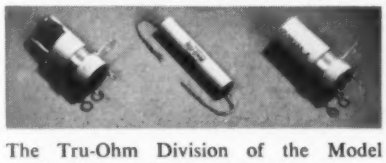
As shown in the graph, both Dow Corning F-4029 and the Dow Corning 200 Fluids are more compressible than the mineral oil commonly used in liquid springs. At 20,000 psi, F-4029 has a compressibility of 10.8% which is mid-way between that of Dow Corning 200 Fluids of the same and of lower viscosity grades. While it lacks the compressibility of the lower viscosity 200 Fluids, Dow Corning F-4029 is less volatile and has a lower viscosity-temperature coefficient. *No. 29*

New 1955 Reference Guide to Dow Corning silicone products gives in 8 pages a brief but comprehensive summary of the properties and applications for the silicone products that are most widely used. Products are indexed by type of application. With increasing effort devoted to product improvement and cost reduction, such a reference guide to this remarkably stable group of engineering materials becomes increasingly important to design engineers. *No. 30*

Buyers Specify Silicone Insulation for Greater Safety in Transformers

Safety conscious plant planners are swinging to silicone insulated, nitrogen-filled transformers for greater protection against fires and explosions. New evidence of this growing trend is the order for over three hundred 30 KVA, 3 phase, dry-type units recently received by Moloney Electric Company of St. Louis. Designed for lighting and small motor service, these transformers are completely insulated with silicone materials to withstand abnormally high ambient or overload temperatures. *No. 31*

Silicone Resin Makes Wire-wound Resistors More Moistureproof



The Tru-Ohm Division of the Model Engineering and Manufacturing Co., of Chicago, has improved its line of wire-wound resistors by using a silicone-based cement that is much more resistant to moisture than the silicate-type cements previously used.

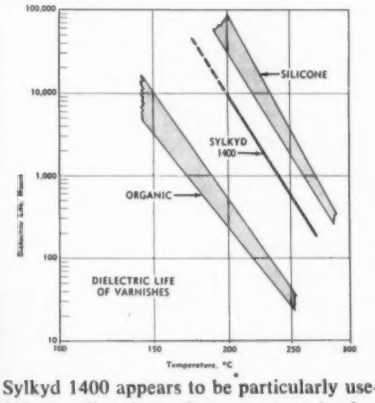
They make this cement by blending Dow Corning 996 silicone varnish with appropriate inorganic fillers. The material builds up well on the resistance wire and seals the element into the casing. It is set by air drying for 3 hours and then baking for 3 hours at 450 F.

Tru-Ohm produces the new resistors in 10, 15, 20 and 25 watt ratings for top-of-chassis mounting, and in 5, 7 and 10 watt ratings for axial leads. *No. 32*

New Silicone Varnish Improves Performance of Class B Machines

Sylkyd* 1400, a new modified silicone dipping and impregnating varnish, makes possible the production of more durable, more reliable Class B electrical equipment. Highly resistant to heat, it also has excellent bond strength and outstanding resistance to moisture, oil and degreasing solvents.

Accelerated life testing in our motor test laboratory indicates that the insulating life expectancy of Sylkyd 1400 at a hottest spot temperature of 130 C is 25 to 50 times that of Class B varnishes. As shown in the graph, the dielectric life of this new varnish approaches that of straight silicone (Class H) varnishes.



Sylkyd 1400 appears to be particularly useful on railroad traction motors and other heavy duty equipment subject to heavy overloads and periodic cleaning. Costwise, it is less expensive than Class B varnishes when the extra life and reliability are taken into consideration. *No. 33*

*T.M. REG U.S. PAT. OFF.

Design Edition 7

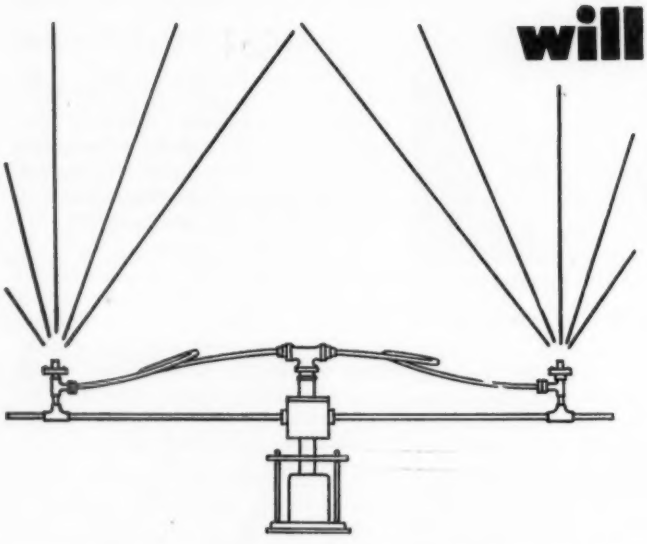
DOW CORNING CORPORATION - Dept. 5303
Midland, Michigan
Please send me more data on numbers:
29 30 31 32 33

NAME _____
TITLE _____
COMPANY _____
STREET _____
CITY _____ ZONE ___ STATE _____

ATLANTA • CHICAGO • CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEW YORK • WASHINGTON, D. C. (Silver Spring, Md.)
Canada: Dow Corning Silicones Ltd., Toronto; **England:** Midland Silicones Ltd., London; **France:** St. Gobain, Paris

THIS AUTOMATIC P

will save you money *and give you* a better product



It pays for

Cost reduction paid for this Automatic paint applicator in the first 12 months. (*Others have regained the cost within 6 months.*)

It sounds like fiction, but the *facts* are that this Automatic Paint Applicator, by Spra-Con (with the exclusive Rotary Arm Principle), *paid for itself* during the first 12 months of operation–*Paid for itself* in the reduced requirements for paint and other readily accountable manufacturing costs.

One by one the leading appliance and metal products manufacturing plants are *changing* from conventional hand spray methods of applying prime coats *to the Automatic Paint Applicator.*

The Spra-Con Rotary Arm Applicator not only *pays for itself* in material savings, but produces a quality and uniform finish.

The Spra-Con Rotary Arm Applicator extends the uniform coatings into areas not accessible even to hand operated spray guns.

Write for case history information and the names of companies using Spra-Con Equipment in your field.

SEND FOR THIS *FREE* BOOKLET

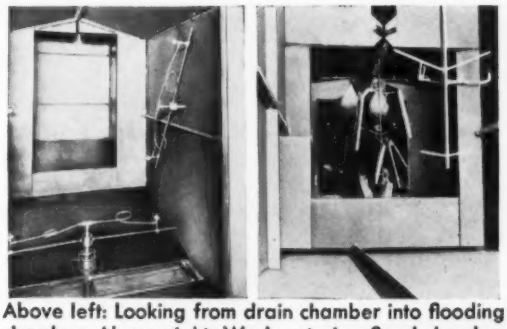
The SPRA-CON COMPANY

3600 ELSTON AVENUE • CHICAGO 18, ILLINOIS

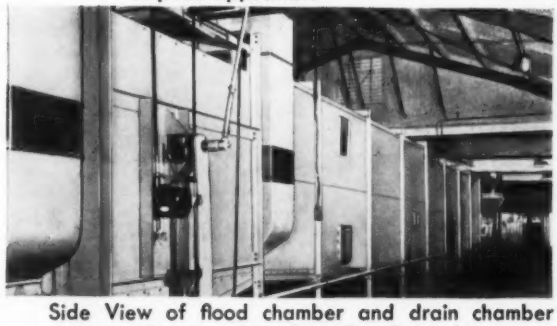
ENGINEERS AND MANUFACTURERS OF WASHERS, OVENS, AUTOMATIC PAINT APPLICATORS CONVEYORS, AND EQUIPMENT FOR COMPLETE PAINT FINISHING SYSTEMS

PAINT APPLICATOR

r Itself!



Above left: Looking from drain chamber into flooding chamber. Above right: Work entering flood chamber of paint applicator.



Side View of flood chamber and drain chamber sections of a complete Spra-Con Paint Applicator.

Control system and material tanks for the Spra-Con Rotary Arm Paint Applicator. System requires only part of one operator's time.

CASE HISTORY FROM A PRODUCTION INSTALLATION

ke-up air used

Hand Spray	50,000 cu. ft. per min.
Spra-Con Automatic	5,000 cu. ft. per min.
SAVINGS	45,000 cu. ft. per min.

r Replacement

Hand Spray	60,000 cu. ft. per min.
Spra-Con Automatic	None
SAVINGS	60,000 cu. ft. per min.

Water Consumption

Curtain Wall Booth	1,220 gal. per min.
Spra-Con Automatic	None
SAVINGS	1,220 gal. per min.

Material Loss

Hand Spray (Paint)	$56,000 per year
Spra-Con Automatic (Paint & Solvent)	15,250 per year
SAVINGS	$40,750 per year

nclude savings on electric power, steam, compressor, booth and air replacement, maintenance— this plant saved $127,785 during one year's operation.

New associate members — *of the American Home Laundry Manufacturers Association are Detroit Controls Corporation and The Glidden Company. The official AHLMA representatives of the two firms are C. O. Hutchinson (center), Glidden, and F. J. Kreissl (right), Detroit Controls. On left is C. C. Daily, of Firestone, chairman of the AHLMA Associates Committee. Photo was taken at recent annual meeting of the association.*

size and give us the benefit of its advice.

Then comes the final step, the translation of all this into a final full size model, made in all the actual materials and colors so that all may see the finished product.

This work is done by experienced craftsmen whose manual skills are second to none in industry. It has always been one of my pleasures to watch one of these fine artisans as he files a casting into a beautiful piece of hardware or forms a flat piece of steel into the graceful curve of a door.

I have often said that the age of craftsmanship has not departed; these men are now devoting their talents as are so many others toward making "more and better things for more people."

Now, at last, the final hour has come, the finished product is presented. Again top management considers the product and makes its final decisions. The appliance is then ready to be turned over to the engineers for final production.

Color in the appliance field

Almost all people in the design field for many years have advocated the judicious and tasteful use of color as one of the elements in the design of any product. Completely detached units such as automobiles have forced themselves from the restraint of "any color as long as it is black" for many years even though here, too, the problem of inventory is present. Plumbing fixtures have overcome this limitation and are

"HOW MEYERCORD SERVES INDUSTRY"
No. 5 of a Series

MEYERCORD *Nameplate* DECALS Help You KEEP Your Product SOLD

Meyercord Decals solve this dealer identification and service problem effectively with a time-tested, low cost "factory-dealer" nameplate plan which combines your trademark with the name, address, and phone number of your local authorized dealer. Although ordered by the manufacturer, Meyercord Dealer Decal Nameplates need cost him nothing.

We create, design, develop and produce factory-dealer decals in any combination of colors, shape, size and artwork, in any quantity. Dealers order small quantities from your company as needed. Meyercord then "personalizes" each dealer order and drop-ships. Let a Meyercord representative provide complete details and recommendations . . . without obligation.

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Send today, on your company letterhead, for full-color guide to every industrial problem in marking, indentification.

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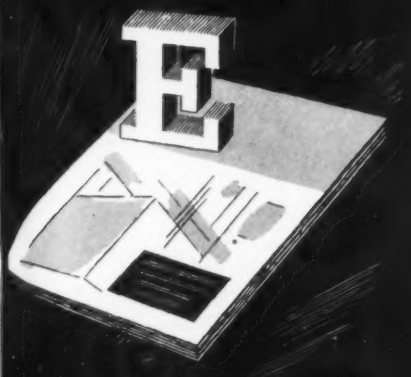
1920 FERRO 1955

business grown big through SERVICE



1923

Ferro publishes "The Enamelist", first business publication devoted exclusively to Porcelain enamel.

1955

Ferro sparks broader promotion of Porcelain enamel with industry-supporting campaign in Saturday Evening Post.

FERRO CORPORATION

cleveland · nashville · los angeles

IN CANADA: FERRO ENAMELS, LTD., OAKVILLE, ONT.

available in a variety of handsome colors, to capture the fancy of the prospective purchasers and widen the decorative opportunity of the home. It was inevitable that color would come to the kitchen, the forgotten orphan of the home, and it remained only for us to find a successful way to apply it.

We assembled over 1,000 samples of various standard materials which find themselves used in the kitchen today to aid us in our consideration of the final colors to be put in production.

This collection of counter top materials, flooring samples, wallpapers, etc. was sorted into color families and only then was the color selection made. Numerous refrigerators and ranges were painted until the best possible choices were made in relation to other existing materials and I am happy to say that our choice has stood up well. I count it a distinct step forward in providing the customer a new pleasurable choice in the merchandise he buys.

In connection with the subject of designing tomorrow's appliances, I offer a quotation of Mr. Charles F. Kettering. "We had all better be very interested in the future for that is where we will spend the rest of our lives."

Adapted for *finish* from an address before the 23rd annual meeting of the Porcelain Enamel Institute.

VENDO SETS UP ENGINEERING SCHOLARSHIP

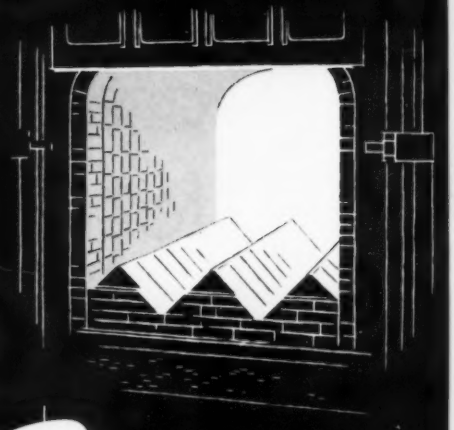
The Vendo Co., Kansas City, Mo., recently set up the first scholarship for study and research in the field of engineering to be granted by a manufacturer of automatic merchandising equipment.

T. DeWitt Carr, dean of the School of Engineering and Architecture, University of Kansas, has announced that a scholarship of $500 has been awarded for the academic year of 1954-55 to Philip Boling, a senior.

In addition to the individual award, Vendo has arranged for a fund of $250 to be available each year for the benefit of engineering students in general.

1920 FERRO 1955

A business grown big through SERVICE

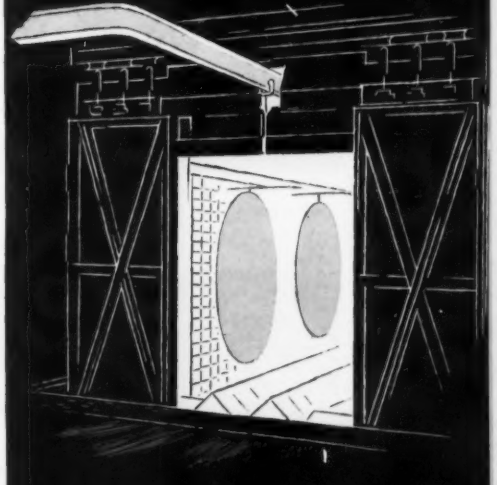


1923

Ferro builds first "V-bottom" batch furnace, providing much greater radiation area, improved heat distribution.

1955

Ferro "V-bottom" batch furnaces in industry have annual capacity of **125 million** sq. ft. of Porcelain enameled ware.



FERRO CORPORATION

cleveland · nashville · los angeles

IN CANADA: FERRO ENAMELS, LTD., OAKVILLE, ONT.

now. . . another New Process SERVICE to ENAMELERS

central source of supply for cast iron enameling

RANGE GRATES

RANGE BURNERS

SERVICE-TO ENAMELERS tells in three words the story behind the growth of New Process D-Enameling Corporation. Management and production people alike have learned that D-Enameling is a profit maker—worth far more than the negligible effort involved in putting the damaged parts aside for shipment by truck or rail to our plant.

Now, New Process launches another special SERVICE TO ENAMELERS . . . wet process cast iron enameling! Now, New Process becomes a central source of supply with large volume-low cost production for this special work which relieves range plants from the nuisance of having to run these parts on a special shift. You'll be surprised how economically we can enamel grates, burners and other cast iron parts for you. Won't you give us the opportunity to quote?

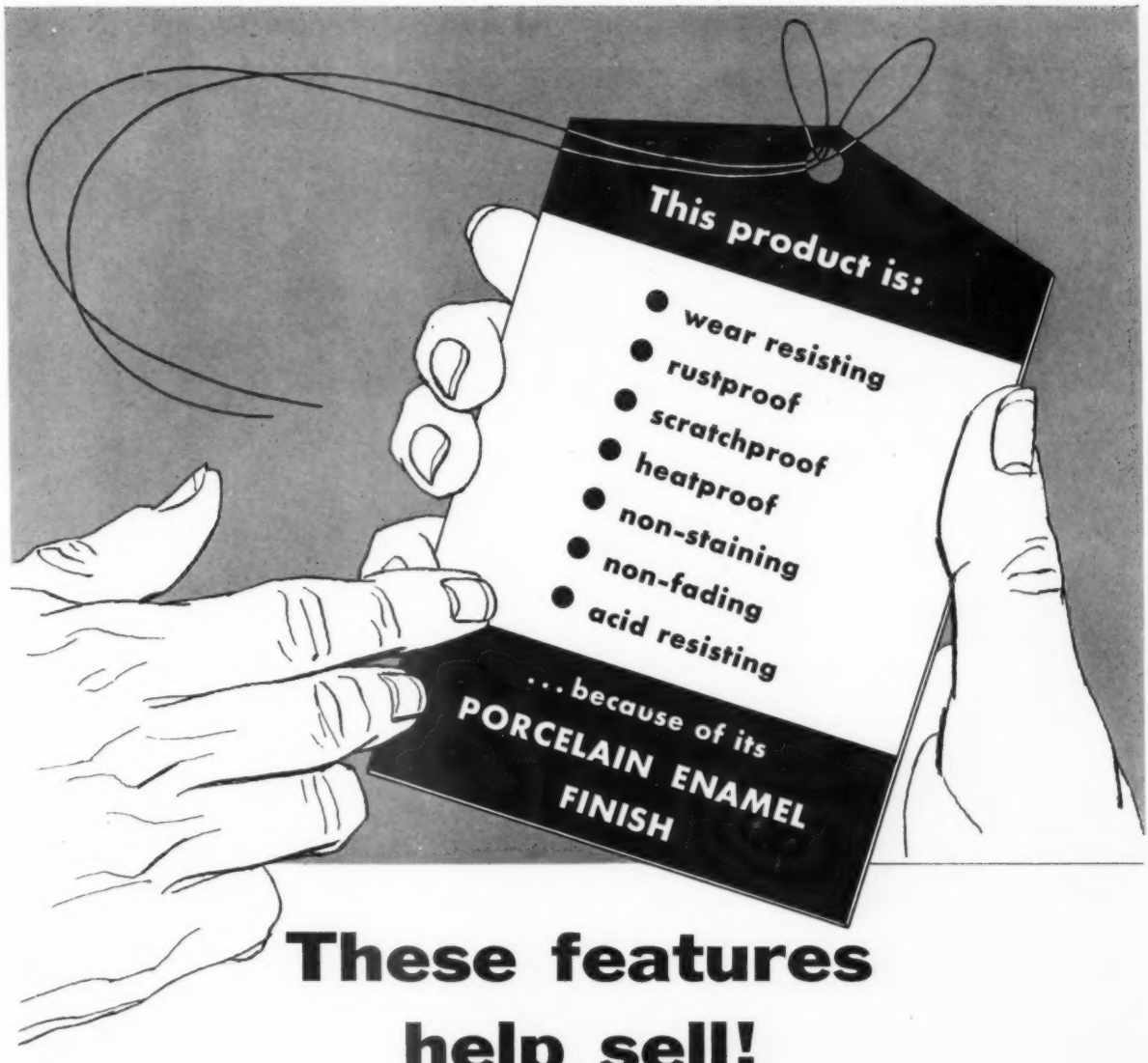
New Process *D-Enameling* Corp.

Highland and New Haven Avenues • Aurora, Illinois

THESE INDUSTRY LEADERS KNOW FROM EXPERIENCE THAT D-ENAMELING TRANSFORMS SCRAP LOSS INTO PROFIT DOLLARS

THE CAUSTIC BATH

ARROW SIGN CO. • BRIGGS MANUFACTURING COMPANY • CAPITAL AIRLINES • CHALLENGE STAMPING & PORCELAIN CO. • CLEVELAND-TENNESSEE ENAMEL COMPANY • CLYDE PORCELAIN STEEL DIV. • CONLON-MOORE CORPORATION • CRIBBEN AND SEXTON COMPANY • CROWN STOVE WORKS • DWYER PRODUCTS CORPORATION • ESTATE HEATROLA DIVISION • FLORENCE STOVE COMPANY, Kankakee • GENERAL PORCELAIN ENAMELING AND MANUFACTURING COMPANY • GIBSON REFRIGERATOR COMPANY • GLOBE AMERICAN CORPORATION • GRAY & DUDLEY CO. • ICE COOLING APPLIANCE COPORATION • LAWNDALE ENAMELING CO. • A. J. LINDEMANN & HOVERSON COMPANY • MAGIC CHEF INC. • MALLEABLE IRON RANGE COMPANY • MAYTAG CO. • MURRAY CORP., Scranton • NORGE DIVISION, Effingham • NORGE DIVISION, Muskegon Heights • PRENTISS WABERS PRODUCTS CO. • GEO. D. ROPER CORPORATION • RHEEM MANUFACTURING CO. • SAMUEL STAMPING & ENAMELING CO. • A. O. SMITH CO. • THE ENAMEL PRODUCTS COMPANY • THOR CORPORATION • TYLER FIXTURE CORPORATION, Waxahachie.



These features help sell!

Porcelain Enamel provides the longest-lasting, easiest-to-clean, most stain-free, heat-proof, corrosion-resisting, scratch-proof finish known today! With these advantages, your products have greater *sales appeal* because buyers appreciate the beauty and durability of Porcelain Enamel.

Actually, Porcelain Enamel is not just a finish—it is a distinct material composed of a non-corrosive, completely inorganic coating inseparably fused at high temperatures (about 1500 F) to a metal base. It is strong, rigid and durable. It offers many opportunities to save money by replacing more expensive materials and by eliminating costly finishing operations.

We will be glad to send you an engineering manual in which you will find the very latest design information on this modern material. It may help you use Porcelain Enamel to reduce your costs and increase the salability of your products. Send the coupon today!

Lifetime PORCELAIN ENAMEL
PORCELAIN ENAMEL INSTITUTE, INC.

PORCELAIN ENAMEL INSTITUTE, INC.

1346 Connecticut Avenue, N. W. • Washington 6, D. C.

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1346 Connecticut Ave., N. W., Washington 6, D. C.
Please send a copy of the PORCELAIN ENAMEL DESIGN MANUAL to:

Name_____

Company_____

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F 185

service

What is your interpretation of service? Experience? Help? Facilities? Speed? Service really boils down to PEOPLE . . . the right people at the right time with the ability to supply the right answers. That's a picture of PEMCO SERVICE.

PEMCO CORPORATION • BALTIMORE 24, MARYLAND

Manufacturers of "The World's Finest" Porcelain Enamel Frits, Coloring Oxides, Screening Pastes, Glaze Frits, Body and Glaze Stains, Underglaze and Overglaze Colors, Vitrifiable Glass Colors.

RUNDELL RESIGNS AS SERVEL VICE PRESIDENT

T. W. Rundell has resigned as vice president in charge of operations at Servel, Inc., Evansville, Ind., to accept a key position with Tecumseh Products Co., Tecumseh, Mich., it has been announced by Rundell and Duncan C. Menzies, Servel president.

Rundell joined Servel in 1952 as vice president in charge of engineering and in 1953 was made vice president in charge of operations.

NORGE JAN. SALES HIT RECORD

Factory sales of Norge products in January exceeded $15,100,000, a record for a single month and nearly equal to the entire first quarter volume of 1954, it was announced by Judson S. Sayre, president.

TAPPAN STOVE PROMOTES SIX ENGINEERS

Six members of the Tappan Stove Co.'s engineering department have been promoted to new positions, it has been announced by W. H. Tappan, vice president and general manager.

R. M. Lamb, vice president in charge of inter-plant coordination in Mansfield, Murray, Kentucky; Los Angeles and Montreal; Truman B. Clark, director of engineering; Robert G. Sheidler, chief development engineer; Charles M. Mayer, chief research engineer and manager of long range research programs; Richard L. Perl, supervisor of research and testing; and Robert B. Adamson, assistant chief of production engineering.

Gilbert L. Dobson will continue as chief production engineer.

PHILCO APPOINTS LAGORE & MCLEAN

Appointment of Joseph A. Lagore as vice president - manufacturing and James D. McLean as vice president-sales of the government and industrial division, has been announced by James H. Carmine, president, Philco Corp.

Lagore was previously general manager in charge of operations of the division. McLean was general sales manager.

CALORIC CHANGES NAME

Caloric Stove Corp., Topton, Pa., has made a change in its corporate title to Caloric Appliance Corp., reported Julius Klein, president.

AMANA TO INCREASE PRODUCTION OF FREEZERS ROOM AIR CONDITIONERS

Amana Refrigeration, Inc., Amana, Iowa, plans to increase freezer production and double production of room air conditioners in 1955, it was announced by George C. Foerstner, executive vice president.

Amana's freezer volume in the last quarter of 1954 doubled that of 1953 and was the best in the company's history.

MERCER SALES MANAGER BROWN STOVE WORKS

K. H. Brown, secretary-treasurer and general manager, Brown Stove Works, Inc., Cleveland, Tenn., has announced the appointment of Robert E. Mercer as sales manager.

Mercer was formerly president of Mede Corp., Highland Park, Ill. manufacturers of industrial low-temperature equipment.

WESTINGHOUSE APPOINTMENTS

The following appointments have been announced by Westinghouse Electric Corp.: John F. Myers, vice president and general manager of consumer products; Victor Kniss, president of Westinghouse Electric Supply Co., wholesale marketing subsidiary; and Edward J. Kelly, general manager of the television-radio division.

MAGIC CHEF NAMES TRUEBLOOD

Magic Chef, Inc., St. Louis, Mo., has announced the appointment of

W. T. Trueblood to the newly created position of merchandising manager, gas range division. He was formerly sales promotion manager.

PROCTOR '54 SALES 20% OVER '53

Walter M. Schwartz, Jr., president, Proctor Electric Co., Philadelphia, Pa., has announced a 20% increase in sales over 1953, making 1954 one of the top years in the company's history.

WHIRLPOOL UPS HERRMAN

The appointment of L. C. Herrman as assistant to the controller for Whirlpool Corp. has been announced by E. C. Cudmore, controller.

SERVEL ELECTS WALL VICE PRESIDENT

John H. Wall, who was recently appointed general manager of the newly created home appliance division, Servel, Inc., Evansville, Ind., has been elected a vice president, according to Louis Ruthenburg, board chairman, and Duncan C. Menzies, president.

The home appliance division is one of 5 autonomous operating divisions in Servel's new organization chart. Wall is completely accountable for all phases of procurement, manufacturing, marketing, distribution and customer service for the refrigeration and air conditioning products.

Before joining Servel, Wall was vice president in charge of manufacturing for Kent Plastics Corp., Evansville.

WESTINGHOUSE COMPLETES MANSFIELD PLANT ADDITION

The completion of the first phase of the current $2½ million expansion program of the Westinghouse Electric Appliance Division plant, Mansfield, Ohio, has been announced by J. H. Ashbaugh, vice president of the division.

A four-story addition totalling 34,000 sq. ft. of working area, has brought the total square footage in the plant to approximately 1,900,000.

NORGE SETS 1955 AD BUDGET

A 1955 advertising budget of $4,100,000, a new high for the company, has been set by Norge.

SIMONDS WORDEN WHITE ELECTS MEACHAM PRESIDENT

The Simonds Worden White Co., Dayton, Ohio, manufacturers of industrial grinding wheels, has announced the election of Floran L. Meacham as president and general manager. H. R. Simonds was elected board chairman, and Dr. Frank R. Henry was made vice chairman.

Meacham has previously been associated with Armco Steel Corp. for 4 years, Frigidaire division, General Motors Corp. for 16 years and Chicago Vitreous Corp. for 7 years,

COLORFUL *vitreous enameled* ALUMINUM

can help you make a faster-selling product

There's nothing like *vitreous color* on lightweight aluminum to make your product sell faster!

Du Pont Vitreous Enamel for Aluminum provides coatings in a wide range of colors and surface textures . . . gives aluminum products durable finishes that resist abrasion, thermal shock, impact and flexing.

Vitreous enameled aluminum can be sawed, sheared, drilled and punched without spalling, and because these rugged coatings add rigidity to aluminum sheet, you can use lighter gauge aluminum . . . cut your packaging and shipping costs.

We can put you in touch with experienced aluminum enamelers.

For more information just check coupon below.

DU PONT
VITREOUS ENAMEL
FOR ALUMINUM
DU PONT
Better Things for Better Living
. . . *Through Chemistry*

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Dept. F255, Wilmington 98, Del.

☐ Please send me your illustrated folder on Vitreous Enamel for Aluminum.

☐ Please have an experienced enameler contact me.

Name _____

Firm _____ *Position* _____

Address _____

City _____ *State* _____

where he was vice president and general manager.

Most recently he was general works manager, Crosley Bendix home appliance division, Avco Mfg. Corp.

Meacham is past president of the Porcelain Enamel Institute and the Dayton chapter of the American Society for Metals.

C. I. T. NAMES CATHCART REGIONAL VICE PRESIDENT

C.I.T. Corp., industrial financing firm, has named William G. Cathcart regional vice president, supervising

operations in an area running from Canada to Mexico, according to Sydney D. Maddock, president.

As C.I.T.'s first regional vice president, Cathcart will supervise division offices in Chicago, Kansas City, Houston and Memphis. He will be responsible for the firm's activities in 21 states.

C.I.T. Corp., a subsidiary of C.I.T. Financial Corp., handles the installment financing of machinery and equipment used in some 90 fields of industry.

HALLSE WINS U. OF I. STUDENT SPEAKING CONTEST

Robert Hallse, junior in ceramic engineering, won the annual student speaking contest in the University of Illinois Dept. of Ceramic Engineering. The contest was held during the monthly Student Branch meeting.

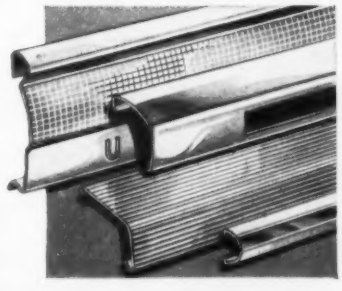
Hallse's topic was "The effect of Copper Oxide Frit Additions in a Titania-Bearing Porcelain Enamel." He will represent the University of

HIGH LIGHT
your products with
PYRAMID MOULDINGS

Full-Width Lamp Shades Add Brilliance To New Range Designs!

Todays trend to *full-width* lighting in range design offers opportunity to add sparkle to appearance—whether lamps are off or on! The Norge shade shown above typifies this added appeal—mirror bright to catch the eye, with product name attractively identified!

This is but one of many sales-stimulating examples of roll-formed trim by Pyramid, designed to step up sales and bring down cost! Others, currently used by major producers, are shown at the right. You, too, can add to the saleability of your product with roll-formed mouldings by Pyramid. And, at the same time, you can save production headaches – for Pyramid plants are *completely* equipped to serve your every trim need. Write today for *your* copy of the Pyramid Plan Book of Metal Mouldings.



Pyramid Mouldings Inc.
5365 WEST ARMSTRONG AVE., CHICAGO 30, ILL.
NEW YORK... CALIFORNIA

SEND FOR YOUR FREE COPY OF "PLAN BOOK OF METAL MOULDINGS"

No one connected with the design or manufacture of any appliance should be without a copy of this book containing hundreds of standard and special mouldings. Send for your free copy today.

Without obligation, please send copy of "Plan Book of Metal Mouldings." F-3

Name_____ Title_____

Firm_____

Address_____

Illinois at the nationwide student speaking contest at the American Ceramic Society Convention in Cincinnati in April.

MOTOR PRODUCTS REJECTS OFFER

Stockholders of Motor Products Corp. and Deepfreeze Appliance Division have rejected the offer by General Tire & Rubber Co. to purchase control of Motor Products, it is reported by F. F. Duggan, vice president and general manager, Deepfreeze Div.

SKYSCRAPER BANK GETS PORCELAIN ENAMEL EXTERIOR

Seaporcel Metals, Inc. set late February as the date for completion of the porcelain enamel exterior curtain wall of the $2,500,000 First Security Bank Building in Salt Lake City, consisting of 12 stories.

M. Jesse Salton, Seaporcel president, said the porcelain enamel on steel represents "one of the most extensive and unique applications of our material to date."

'54 RECORD YEAR FOR GAS FURNACE SHIPMENTS

Shipments of gas-operated furnaces set an all-time record of 670,300 units during 1954, according to the Gas Appliance Manufacturers Association.

Edward R. Martin, director of marketing and statistics, reported that last year's total exceeded the 1953 shipments by 30.5%.

SERVEL LAUDS PERSONNEL RELATIONS; APPLE PROMOTED

Recognition has been accorded personnel relations as a top-level staff

function in the new organization chart of Servel, Inc., Evansville, Indiana.

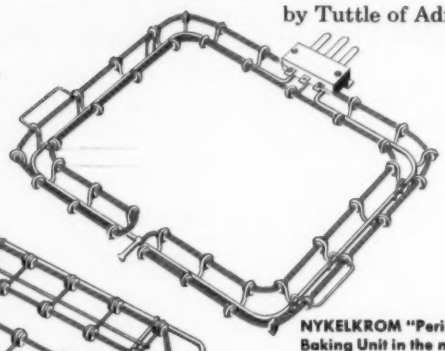
Allen E. Apple, formerly industrial relations manager, has been promoted to manager of employee relations, according to Louis Ruthenburg, board chairman, and Duncan C. Menzies, Servel president. Apple will report directly to Menzies.

WESTINGHOUSE VACUM SALES HIT RECORD HIGH

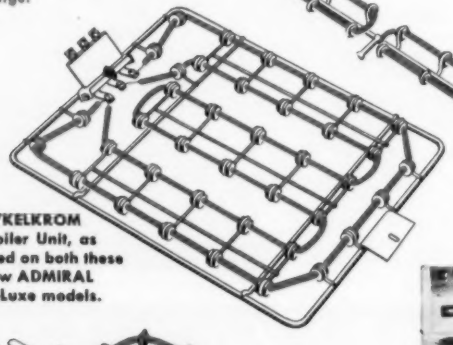
Sales of Westinghouse vacuum cleaners during 1954 hit an all-time high, it was announced by Robert E. Dobson, manager, Westinghouse vacuum cleaner department.

New ADMIRAL 3EH14 30" DeLuxe Single-Oven Range.

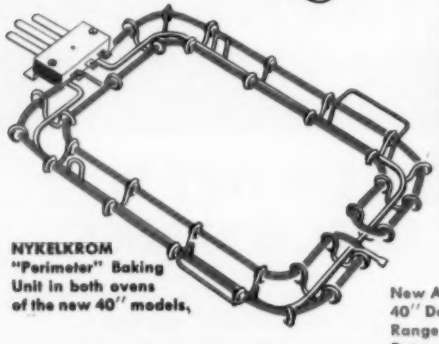
The new ADMIRAL Electric Ranges for 1956 present the newest and finest developments in electric cookery. It is worthy of note that the new ADMIRAL Ranges use the famous Saddle-Loop and "V" Saddle-Loop NYKELKROM heating elements built by Tuttle of Adrian.



NYKELKROM "Perimeter" Baking Unit in the new 30" model.



NYKELKROM Broiler Unit, as used on both these new ADMIRAL DeLuxe models.



NYKELKROM "Perimeter" Baking Unit in both ovens of the new 40" models.

New ADMIRAL 4EH15 40" DeLuxe Double-Oven Range with built-in Rotary Roaster.

H. W. Tuttle & Co.

ADRIAN, MICHIGAN

Manufactured and distributed in Canada by Macdonald Metals & Plastics, Ltd., Waterloo, Quebec

MAGIC CHEF APPOINTS PIERCE

K. O. Dupree, general sales manager, Magic Chef, Inc., has announced the appointment of A. R. Pierce, products manager, heater division, as special factory representative to handle national space heater accounts, a new position.

Pierce has been with Magic Chef since 1926.

AHLMA AWARDS MRS. KIENE HONORARY LIFE MEMBERSHIP

Mrs. Julia Kiene, manager of the Westinghouse Home Economics In-

stitute, has been awarded an honorary life membership in the American Home Laundry Manufacturers' Association, according to Guenther Baumgart, AHLMA executive director.

Mrs. Kiene, the only woman ever to have been given this recognition, was the first chairman of the AHLMA home economists' committee and has been active in the planning and managing of the annual national home laundry conferences.

Mrs. Kiene recently finished a ten-year study of washing synthetic fabrics, which proved that man-made fabrics can be washed successfully in the household washer.

NORGE APPOINTS MILLER REFRIGERATOR SALES MANGER

Appointment of Raymond E. Miller as refrigerator sales manager, Norge Div., Borg-Warner Corp., Chicago,

LOOK TO DETREX FOR Service WITH A Saving

If you're satisfied with any other paint base You don't have the facts about

DETREX Paintbond

HOW PAINTBOND EXCELS:

By improved paint base: Paintbond provides greater permanence to your paint finishes than any comparable phosphate coating process . . . you can prove this with your own salt-spray tests! Even when paint is scratched through, corrosion is confined to the exposed metal; spreading corrosion, and resulting paint flaking and peeling, is prohibited!

Further, since Paintbond consists of much finer-grained crystalline structure, it imparts a smoother, more lustrous finish to your products. At the same time, paint is securely interlocked with the metal for extreme durability.

By dollar savings: It is an easily proven fact that Detrex Paintbond will coat a substantially greater surface area per drum of compound, or will provide a heavier coating with the same amount of compound. This means important dollar savings for you. Since Paintbond goes further and is easier to control in solution, you enjoy maintenance savings, too.

By flexibility: Whether applied by spray or immersion, Paintbond can easily be controlled to give exactly the coating weight and crystal size you desire. This important advantage spells satisfaction on every type of product and application.

By added merchandising value: Detrex makes available to Paintbond users an attractively designed sticker for application on their finished products. At point of sale, this sticker becomes another sales clincher for your product as it informs the customer of the life-time, rust-free paint finish that Paintbond provides.

Paintbond *IS* different . . . the benefits above are but a few reasons why. Like all Detrex processes, results are fully guaranteed. You can get *all* the facts by using the coupon below . . . do it today for better paint finishes at lower cost tomorrow.

Please send us complete facts about Paintbond and how it will improve our finishes while cutting our costs.

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

DETREX CORPORATION

DEPT. PB-107, BOX 501, DETROIT 32, MICH.

has been announced by W. C. Conley, director of product managers.

Formerly Norge sales promotion manager, Miller has directed refrigerator and other appliance sales for Westinghouse Electric Co., Bendix Home Appliances, Inc., and Crosley division, Avco Mfg. Co.

NEW ADMIRAL DIVISION FOR BUILT-IN UNITS

A new built-in range and oven division will be established by Admiral Corp., it was announced by W. C. Johnson, vice president - sales. B. H. Melton, newly appointed contract division sales manager, will direct sales for the new division.

TWO MILLION GAS RANGES SHIPPED FOR EIGHTH YEAR

Shipments of domestic gas ranges exceeded 2,000,000 units for the eighth consecutive year during 1954.

Edward R. Martin, director of marketing and statistics, Gas Appliance Manufacturers Association, reported that the 143,200 shipped during December increased the total for the year to 2,017,200.

FLORENCE STOVE ELECTS WAGGONER

W. C. Waggoner, Jr., has been elected secretary, treasurer and member of the executive committee of Florence Stove Co., Chicago, succeeding A. E. Luke, who has retired after 30 years with the company.

Before joining Florence in 1954 as controller and director, Waggoner had been associated with Carson Pirie Scott & Co. and Sears, Roebuck and Company.

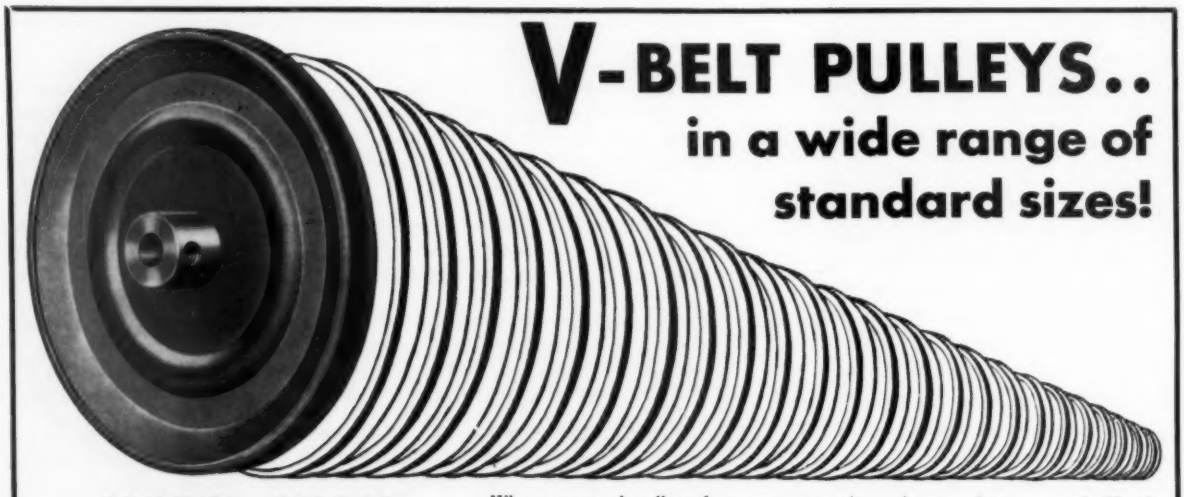
AMERICAN CERAMIC SOCIETY ANNUAL MEETING

The 57th annual meeting of the American Ceramic Society will be held in Cincinnati, Ohio April 24-28, 1955.

The meetings will be distributed over 3 hotels within a one block radius — design, enamel, materials and equipment, structural clay products and white wares, will be held at the Netherland Plaza.

MICKEY PRES. OF SEALTRON

Walter Mickey, formerly vice president of Barrows Porcelain Enamel Co., Cincinnati, Ohio, has been named president of The Sealtron Co.,



V-BELT PULLEYS.. in a wide range of standard sizes!

NAGEL-CHASE CASTERS for YOUR MOBILE APPLIANCES ARE AVAILABLE IN SIZES AND STYLES TO SUIT YOUR NEEDS!

When you need pulleys for your automatic washers or dryers, consult Nagel-Chase. With a wide range of sizes available, ranging from 2-5/16" O.D. to 14" O.D., the probabilities are that just the size you need is available. Of course, if your quantities required are large enough to warrant it, these specialists in V-Belt pulley manufacture can produce any size you need.

Nagel-Chase pulleys are precision-built of welded pressed-steel with solid steel hub . . . light-weight and designed for long, trouble-free service.

Whatever your requirements in pulleys or casters, consult Nagel-Chase first.

THE NAGEL • CHASE MANUFACTURING COMPANY
2811 N. Ashland Avenue, Chicago 13, Ill.
SPECIALISTS IN CASTERS AND PULLEYS FOR NEARLY A QUARTER CENTURY!

Cincinnati, manufacturers of hermetic materials.

PERFECTION ELECTS CASE SECRETARY AND TREASURER

Manning E. Case has been elected by Perfection Stove Co.'s board of

directors to the post of secretary and treasurer, succeeding Paul T. Skove, who is retiring after 45 years with Perfection.

John H. Foster is assistant secretary and treasurer.

JERNSTEDT HEADS NEW WESTINGHOUSE LAB.

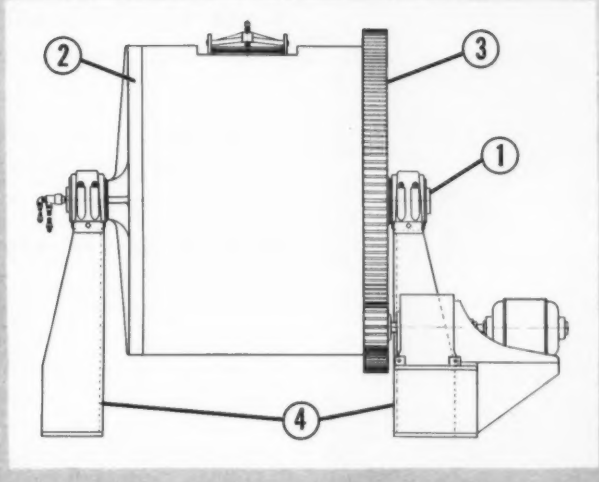
The appointment of George W. Jernstedt as director of a new manufacturing laboratory of the Westinghouse Electric Corp., has been announced by D. C. Burnham, vice president in charge of manufacturing, and W. C. Allen, director of manufacturing and equipment engineering.

The new laboratory will develop improved methods, techniques and equipment for manufacturing needs.

PLUMBING AND HEATING EXPOSITION TO BE HELD IN CHICAGO, JUNE 6-9

Approximately 175 manufacturers of plumbing, heating, home appliances and allied lines have contracted for space in the National Plumbing and Heating Exposition to be held at Navy Pier, Chicago, June 6-9, 1955, announced R. E. Murphy, president of the National Association of Plumb-

HERE'S HOW STEVECO MODERNIZED THE BALL MILL



These outstanding design features assure quiet, efficient, trouble-free operation with less horsepower.

(1) ROLLER BEARINGS

Anti-friction, self-aligning type reduce horsepower requirements up to 25%.

(2) CAST STEEL HEADS

With integrally cast steel trunnions . . . shell welded to head . . . no leaking.

(3) MORE TEETH IN RING GEAR

2½ teeth in mesh at all times for smoother, vibration-free operation, longer life.

(4) WELDED STEEL MOUNTING STANDS

Motor base is integral part of mill stand . . . assures constant alignment.

The new Steveco mills are built in standard sizes up to 8' diameter. Get the full story on the modern line of ball mills designed to meet today's production requirements.

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THE STEVENSON COMPANY

228 N. WILKINSON ST. • DAYTON, OHIO

Plant in Wellsville, Ohio

Sales Representatives in Principal Cities

1920 FERRO 1955

A business grown big through SERVICE

1925

Ferro sets up formal Research program to bring more of modern science into field of Porcelain enameling.

1955

Ferro devotes 2½% of income to Research, provides 150,000 sq. ft. of floor space for program.

FERRO CORPORATION

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IN CANADA: FERRO ENAMELS LTD., OAKVILLE, ONT.

ing Contractors and general chairman of the Exposition.

The Exposition will be held in connection with the 73rd annual convention of the Association.

NORGE ADDS HOME ECONOMIST

Mrs. Glena Pierce has been appointed a home economist by the Norge Div., Borg-Warner Corp., announced Mrs. Jessie Cartwright, director, Norge Home Institute.

NEMA '54 SALES FIGURES

Sales of electric ranges for the first 11 months of 1954 totalled 987,377. Total sales of electric household refrigerators were 2,846,438. Electric storage water heater sales, 554,891, and electric farm and home freezer sales were 38,872, it has been announced by National Electrical Manufacturers Association.

JONES, SERVEL VICE CHAIRMAN, DIES

W. Paul Jones, vice chairman of the board of directors, Servel, Inc., Evansville, Ind., died on January 20.

He was president of the company from 1949 to 1954.

'54 WATER SOFTENER SALES 20 TO 25% ABOVE '53

Sales of water softeners for home, industrial, institutional, and commercial use in 1954 were 20 to 25% ahead of 1953 on an industry-wide basis, according to John Hosford, executive secretary, The Water Conditioning Foundation.

GLOBE AMERICAN SHOWS APPLIANCE-STYLED SOFTENER

An appliance-styled "Rain-O-Matic" water softener was introduced by Globe American Corp., of Kokomo, Indiana, at the Winter Homefurnishings Market, in Chicago.

The unit, which features completely automatic regeneration, is porcelain enameled inside and out. It has a flow rate of 10 gallons per minute, and can remove 25,000 grains hardness from water between automatic regeneration. It is fully-automatic, and can be set to regenerate during the night at a convenient hour.

Ivalu Willis was on hand at Globe American's space in the Merchandise Mart, during winter market, to demonstrate the "Rain-O-Matic" water softener.

finishfoto

DAY & NIGHT PRODUCT MGR.

Day & Night Div., Affiliated Gas Equipment, Inc., has announced the appointment of Richard Whitney as product manager for water and space heating equipment.

MAGIC CHEF NAMES GRUER ASSISTANT TO PRESIDENT

Cecil M. Dunn, president, Magic Chef, Inc., St. Louis, Mo., has an-

nounced the appointment of A. W. Gruer, Jr., to the new position of assistant to the president. He assumes this post in addition to his duties as market research manager.

UNITED METAL CABINET JOINS ASSOCIATION

United Metal Cabinet Corp., Brooklyn, N. Y., is a new member of the Steel Kitchen Cabinet Mfgrs. Assn., it was announced by Arthur J. Tuscany, Jr., executive secretary.

H. Denner, assistant to vice president, will represent the company.

Hot spray process

→ *from Page 45*

spraying may require up to 50% for electrostatic application, assuming that the very desirable qualities of low atomizing pressure and low fluid pressures are maintained.

To be specific with respect to parts of enamel/parts of solvent: An enamel requiring 1 part of solvent to 4 parts of enamel for conventional spraying may require as much as 1

NICKELOID METALS

more than a metal!

You by-pass 3 out of 5 basic production steps . . . . cut costs 15 to 20 per cent or more when you use the Nickeloid Method of producing plated metal parts and trim. That's because Nickeloid Metals are PRE-plated in durable, uniform finishes of chrome, nickel, copper or brass; require no cleaning, plating or polishing.* And you don't have to pamper these versatile metals to retain their beautiful mirror-like finishes. Stamp, blank, bend or draw . . . they fit right into standard production techniques.

The Nickeloid Method eliminates three costly steps

No cleaning, plating, polishing. Just fabricate and assemble. 2 steps instead of 5! Nickeloid Metals are also available with Mar-Not protective coating, a fabrication and handling aid.

***Pre-plated to base metals of steel, zinc, copper, brass and aluminum. Available in sheets and coils, interesting patterns and finishes.**

SEND FOR FREE SAMPLER-SELECTOR

In handy slide-chart form, gives specifications, finishes and typical uses of Nickeloid Metals. 8 metal samples. Request yours, on your company letterhead.

NICKELOID METALS SINCE 1898 NM

Sales offices in most principal cities

AMERICAN NICKELOID COMPANY, Peru 11, Illinois

part of solvent to 2 parts of enamel for electrostatic spraying.

It is in this connection that paint heaters can be most helpful. They can be mounted relatively close to the electrostatic spray heads area, as a result of the heat, produce an equivalent viscosity with one half or less than one half of the usual thinner or reducer requirements. This produces superior coverage and helps to eliminate manual touchup.

With the development of the hot spray process and the evolution of the simplified heaters, industry (both large and small companies) is setting new production and quality control standards, and on many types of paint materials.

One major motor car manufacturer has over 200 heaters on a continuous production line. Better holdout and gloss of the automotive finish, as well as substantial material savings have been achieved by this car manufacturer. Fabricated metal products, from cameras to kitchen cabinets, are being produced with lower unit cost and a markedly improved reject ratio.

Ben Hur Manufacturing Co., Milwaukee, Wisconsin, large manufacturer of home freezers, reports a 65% reduction in paint rejects with hot spray equipment. This same firm has been able to produce a better holdout and gloss, and reports a 25% time and material savings since the hot spray process was introduced in their conveyorized operation.

Coverage is markedly improved by hot spray application, and hard-to-cover painting operations are particularly benefited by hot spray because of the heavier bodied paint film. Childers Manufacturing Co., Houston, Texas, a major manufacturer of aluminum awnings, reports major material savings, faster dry, and quality control improvements.

One major chemical plant in the Gulf Coast area that maintains full size painting crews at all times in a constant program of surface protection, investigated hot spray application slightly over a year ago. At that time, the best vinyl protective coatings lasted up to seven or eight months. After one year of exposure on hot sprayed vinyl coatings, cost accounting revealed that the extension of coating life represented savings of thousands of dollars.

Hot spray not a cure-all

Hot spray will not magically cure all paint department problems — but it can materially reduce production headaches by limiting the effect of many of the hard-to-control variables in the paint department. Conventional spraying is a critical operation that is not easily held within the limits of quality control. Hot spray can, in many instances extend the latitude in which temperature humidity and human error may vary without affecting the quality control. In today's increasingly competitive market, production costs are subject to close scrutiny, and hot spray offers one additional important tool for production and cost control.

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PRODUCT ENGINEERING
Starting from design, we develop your product through every stage, including model making, dies, tools, stampings, assembly, finishing and packing for shipment—a Complete Manufacturing Service.
This widely known New Monarch service is backed by engineers and craftsmen carefully trained to a high quality level of production, where precision standards are steadily maintained. It is in this way that New Monarch has, for the past 45 years, continued to meet the most exacting demands of a constantly increasing number of satisfied customers.
New Monarch can help you with your production problems. Let's talk it over!
A complete manufacturing service from blueprint to shipping carton . . . .
Dies, tools, stampings, assembly, finishing and packing—whether it be a single stamping or a complete from-blueprint-to-shipping-carton job, ask New Monarch to bid on your work.
When in need of stampings, see
NEW MONARCH MACHINE & STAMPING CO.
406 S. W. NINTH ST. DES MOINES, IOWA

Unequaled in appearance, wear resistance and performance, Vitro chalkboard colors give a superior writing surface that lasts longer without glossing. They can be economically fired at low temperatures without metal warpage . . . provide greater coverage . . . and assure easier gloss control.

Available in blacks, yellows, whites, greens—also in pastel shades to take water soluble wax crayons.

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A DIVISION OF VITRO CORPORATION OF AMERICA

ONE IDEA
can mean the difference between
PROFIT or LOSS!

One Idea seen at the 1955 Industrial Finishing Exposition and 42nd Annual Convention of the American Electroplaters' Society may save your company thousands of dollars. It can mean the difference between profit or loss.

THE ONLY SHOW IN 3 YEARS! Don't miss this big opportunity for a mutual exchange of ideas, plus a chance to see and talk to all the people who have contributed engineering advancements, research and know-how to the fast changing industrial finishing industry.

1001 IDEAS FOR BETTER FINISHING!

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c/o American Decorating Co.
1849 West 24th Street, Cleveland 13, Ohio

1955 INDUSTRIAL FINISHING EXPOSITION
in conjunction with the
42nd ANNUAL CONVENTION OF THE AMERICAN ELECTROPLATERS' SOCIETY
June 20, 21, 22, 23, 1955—PUBLIC AUDITORIUM, CLEVELAND, OHIO

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PIONEERS IN ENGINEERING, MANUFACTURING & INSTALLING OF

INDUSTRIAL OVENS
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RA 330 HIGH TEMPERATURE TRIANGULAR BARS from WAREHOUSE STOCK

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HEAT RESISTING ALLOY BUYERS

You'll find RA 330 (35 Ni.-15 Cr.) rolled alloy Triangular Bar Stock best for fabricating heat processing equipment. Stocked in ¾", and 1⅛" sizes, RA Triangular Bars are carried in random 12' lengths. If you want top performance, per alloy dollar invested, send for the RA Bar Price Schedule.

RA HAS AVAILABLE A HANDY LITTLE LEATHER-CASED MAGNET FOR QUICK AND CONVENIENT TESTING OF METALS

It's yours for the asking.

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RA 310
RA 309
RA 430
RA 446

ROLLED ALLOYS, INC.
Heat and Corrosion Resistant Alloy Specialists
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NEWS ABOUT SUPPLIERS

PERMACEL EXPANDS SERVICES

A new Permacel Tape Corp. warehouse, designed to expand service in the Ohio, Michigan and Kentucky area, was opened January 15 in suburban Detroit, it was announced by William Bullock, district manager.

MONARCH ALUMINUM NAMES LAWSON VICE PRESIDENT SALES

Raymond Deutsch, president, Monarch Aluminum Mfg. Co., Cleveland, Ohio, has announced the election of Russell A. Lawson, formerly sales manager of commercial castings division, as vice president in charge of sales.

MORDICA & EDWARDS ASSIGNED TO PENNSALT'S GILRON UNIT

John Mordica and Gene C. Edwards, members of Gilron Products Co. sales staff, will continue to service their respective accounts following consolidation of their organization with the Pennsylvania Salt Mfg. Co.

HOUDAILLE-HERSHEY SALES PROMOTIONS

From the North Chicago division of Houdaille-Hershey Corp. has come an announcement from division manager, Eric Boehm, stating that sales of all products manufactured at this division will be supervised in Chicago.

Manufactured at north Chicago are automotive air cleaners, refrigeration condensers and freezer shelves, etc.

Russell A. Johnson will be sales manager. Gordon Lefebvre, Jr., has been made assistant sales manager, and Richard L. Lukey has been advanced to sales engineer.

SMART TO CONGRESS DRIVES

The appointment of William M. Smart as sales manager of the Congress Drives Div., Tann Corp., has been announced by Herman Tann, president.

BOHN ALUMINUM ELECTS KUHN

It is reported that T. W. Kuhn has been elected executive vice president, Bohn Aluminum & Brass Corp., Detroit, Michigan.

ARMCO 'IRON MAN' AWARD GOES TO MIDDLETOWN WORKS

More than 650 Armco Steel Corp. men and women welcomed the company's top safety award, the "Iron Man," on its return to the Middletown Works.

Every year since 1926 it has been awarded to the safety group in the plants which has the lowest number of lost-time accidents per million man hours worked.

DETROIT BRASS UPS RADICE

S. John Radice has been appointed eastern Pennsylvania representative of Detroit Brass & Malleable Co., according to Elmer Groves, vice president.

U. S. STEEL UPS TODD

It is reported that John W. Todd has been appointed assistant general manager of sales administration for U. S. Steel Corp.

BALDWIN-LIMA BUYS HYDROPRESS AND LOEWY

As part of its diversification program, Baldwin-Lima-Hamilton Corp. has acquired Hydropress, Inc., and its subsidiary Loewy Construction Co. Erwin Loewy, industrial designer, will remain as president of Hydropress and Loewy.

KAISER ALUMINUM UPS MCDONALD

Edward L. McDonald has been appointed assistant advertising manager for Kaiser Aluminum & Chemical Corp., Oakland, Calif.

2% OF FERRO SALES SPENT ON RESEARCH & DEVELOPMENT

Ferro Corp., Cleveland, Ohio, spent approximately three quarters of a million dollars, or about 2% of its gross sales, on research and development during 1954, Robert A. Weaver, chairman of the board, announced.

***Grayson controls division** — of Robertshaw-Fulton Controls Co., Long Beach, Calif., will be able to double its production of thermostatic controls and ignition devices for gas heating appliances at its new plant, according to John A. Robertshaw, president. Robertshaw and Thomas T. Arden, executive vice president and general manager of west coast operations, were hosts to several hundred businessmen and community officials at the recent formal opening of the $3,000,000 plant. The 237,000 sq. ft. of floor space in the new plant is almost twice that at the division's former location in Lynwood.*

C. B. LANSING

VIRGIL OWEN

C. P. LAVELLE

R. R. TEASDALE

A. F. BOONE

JOHN GARDNER

OWEN JOINS UNION STEEL PRODUCTS SALES STAFF

W. C. Neumann, sales manager, Wire Products Div., Union Steel Products Co., Albion, Michigan, has announced the appointment of Virgil Owen to the sales staff in the capacity of direct factory representative covering the territory of southern Indiana, Kentucky and Tennessee.

MOTCH & MERRYWEATHER KEY APPOINTMENTS

The board of directors, The Motch and Merryweather Machinery Co., Cleveland, Ohio, has elected George E. Merryweather chairman of the board and secretary; Charles B. Lansing, president; and Clare R. Kubik, executive vice president and treasurer.

GLASS FIBERS UPS MCPEEK

Francis W. McPeek, Glass Fibers, Inc., Toledo, Ohio, has been appointed Cincinnati territory sales representative, according to Raymond W. Capaul, vice president and general sales manager.

U. S. HOFFMAN MACHINERY APPOINTS LAVELLE

The appointment of C. P. Lavelle as division manager, Hygrade Metal Finishing division, United States Hoffman Machinery Corp., New York City, has been announced by Revis L. Stephenson, vice president in charge of the industrial equipment divisions.

MULLINS NAMES BOONE

A. F. Boone has been named manager of contract stamping sales for Mullins Mfg. Corp., Salem, Ohio, it was announced by C. D. Alderman, vice president in charge of sales.

GLIDDEN APPOINTS LONG

Appointment of L. F. Long, Jr. as industrial sales representative of the Nubian industrial division, Glidden Co., has been announced by T. N. Armel, national industrial sales manager of the paint and varnish division.

GASWAY UPS TEASDALE

E. W. Glaeser, president, Gasway Corp., Chicago, manufacturer of metal-treating, roller-coating and laundry machinery, has announced the election of R. R. Teasdale as executive vice president.

GARDNER JOINS ING-RICH LAB STAFF

R. H. Coin, president, Ingram-Richardson, Inc., Frankfort, Indiana, has announced the appointment of John F. Gardner to the laboratory staff as a ceramic engineer.

Gardner has been employed by Ferro Corp. and The Enamel Products Co. of Cleveland, Ohio.

INTERNATIONAL PAPER NAMES FEARING AND SNYDER

Lamar M. Fearing and William S. Snyder have been appointed assistant general sales managers of International Paper Co., New York City, it has been announced by F. Henry Savage, vice president and general sales manager.

RESISTANCE WELDER NAMES CUMMINS AND SWANSON

Boyd Giesey, general manager, Resistance Welder Corp., has announced the appointments of Wayne L. Cummins as district representative for the Dayton-Cincinnati area, and L. E. Swanson as district representative for the St. Paul, Minneapolis area.

NEW BINKS OFFICE

The new address of the Seattle branch of the Binks Mfg. Co. is 514 Denny Way, Seattle 1, Washington. The new and enlarged office is managed by J. C. Level.

DUPONT SALES MEETING

The annual meeting of the Chicago finishes sales office of E. I. du Pont de Nemours & Co. was held at the LaSalle Hotel, Chicago, on January 17 and 18.

W. S. SNYDER

L. M. FEARING

L. E. SWANSON

W. L. CUMMINS

F. W. MCPEEK

L. F. LONG JR.

1920 FERRO 1955

A business grown big through SERVICE

1927

Ferro builds plant in Canada, to serve the growing P.E. needs of our neighbor to the north.

1955

Ferro builds plant in South Africa, the latest of **fourteen** plants bringing modern porcelain enamels to the **world.**

FERRO CORPORATION

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IN CANADA: FERRO ENAMELS, LTD., OAKVILLE, ONT.

BATTLES TO HEAD RHEEM APPLIANCE DIVISION

Stewart S. Battles has joined Rheem Mfg. Co. as general manager of its appliance division, which operates plants in South Gate and Newark, Calif., it was announced by W. S. Rheem II, the firm's general manager.

He was formerly with Norge as vice president of manufacturing and engineering, and previously was vice president of Admiral.

VITREOUS STEEL NAMES LEYERLE VICE PRESIDENT

Arthur R. Leyerle has been appointed vice president of Vitreous Steel Products Co., producers of porcelain enameled products for the appliance and related industries.

He will also continue to act in the capacity of sales engineer for the firm which has general offices in Cleveland, Ohio, and plant facilities in Nappanee, Ind.

AIEE CONFERENCE TO FEATURE BUILT-IN APPLIANCES

The 6th annual Appliance Technical Conference, sponsored by the American Institute of Electrical Engineers, will be held May 23 and 24, at the Hollenden Hotel, Cleveland, Ohio.

Major theme of the 1955 conference is built around the effect of architectural trends on appliance design. The program will include a symposium on this subject, and will give special consideration to built-in appliances, according to B. F. Parr (Westinghouse), chairman, Subcommittee on Domestic Appliances.

This subcommittee is a part of the AIEE Committee on Domestic and Commercial Applications of which T. C. Johnson (General Electric) is chairman.

PEI ANNOUNCES PROGRAM FOR WEST COAST MEETING

The Porcelain Enamel Institute has announced that its Pacific Coast Conference will be held March 10 and 11 at the Biltmore Hotel, Los Angeles.

G. A. Hutt (Ferro), PEI president, will preside at the general session. J. L. Hodgkinson (U.S. Porcelain), vice president, will present the address of welcome; Edward Mackasek, managing director, will follow with the response.

P. B. McBride (Porcelain Metals), treasurer, will report on "Our Financial Foundations. John Oliver, secretary, will cover "PEI Activities Today", and W. N. Brinker, administrative assistant, will discuss "Building Greater Markets."

Reports on division activities will include talks by E. M. Hommel (Hommel), frit division, and H. McE. Patton (Ing-Rich), sign division.

"Porcelain Enamel's Future in Architecture" will be covered in a session presided over by J. W. Vicary (Ervite), architectural division chairman.

"Hot Water Tanks—A Soaring Market" will be covered by several speakers to be selected.

The conference will conclude with an evening meeting with the Pacific Coast Enamelers Club.

METAL STAMPERS ANNUAL SPRING TECHNICAL MEETING

The 6th annual Spring Technical Meeting of the Pressed Metal Institute will be held March 16-18 at the Hotel Carter, Cleveland, Ohio.

Panel discussions will cover the following:

"Safety Doesn't Cost—It Pays", "How We Sell Stampings", "Blue Print Errors of Ommission and Commission", "The Technical Side of Estimating", "St. Patrick Was a Stamper", "Tooling and Producing Stamping", "The Fourth Dimension of Production", "Looking at 1955's Business Prospects", and "New Techniques and Developments."

The last session will cover metal spraying, titanium forming, cold extrusion, and plastic dies.

Included will be supplier exhibits and tours of the plants of American Stamping Co. and HPL Manufacturing Co.

---

safe transit

March • 1955

FROM ASSEMBLY LINE TO FINAL CUSTOMER

AIM* for COST SAVING packaging techniques with Acme Steel Strapping Ideas

Acme Idea Man, Tom Parsons, St. Louis, Mo. helped solve this packaging problem.

ask your
*Acme Idea Man
to help solve your problems

Bulky, hard-to-handle products require complete versatility in packaging operations. Wagner Electric Corporation's Lockheed hydraulic brake assemblies, for example, are palletized for convenience and securely bound with Acme Steel Strapping (Idea No. 437) for in-transit protection. By palletizing and strapping these brake assemblies, both manufacturer and customer have reduced storage space requirements and realized greater over-all handling efficiency. Empty pallets are stacked, strapped and returned for use again and again.

Long experience and engineering ingenuity qualify your Acme Idea Man to offer sound recommendations for improving your packaging and shipping methods. Call him or write, Acme Steel Products Division, Acme Steel Company, Dept. RS-35, 2840 Archer Avenue, Chicago 8, Illinois.

AIM *For Safe, Lower-Cost Shipping*

ACME STEEL CO. CHICAGO

ACME STEEL

safe transit

A monthly trade publication section devoted to improved packaging and shipping and materials handling practices in the home appliance and metal products manufacturing field.

Plant experience information for all executives and plant men interested in the problem of packaging and shipping improvement and loss prevention.

Complete information on the National Safe Transit pre-shipment testing program for packaged finished products, and detailed progress reports of divisions and sub-committees of the National Safe Transit Committee.

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NEW NST CERTIFICATIONS BRING TOTAL TO 188 . . . . . ST-12

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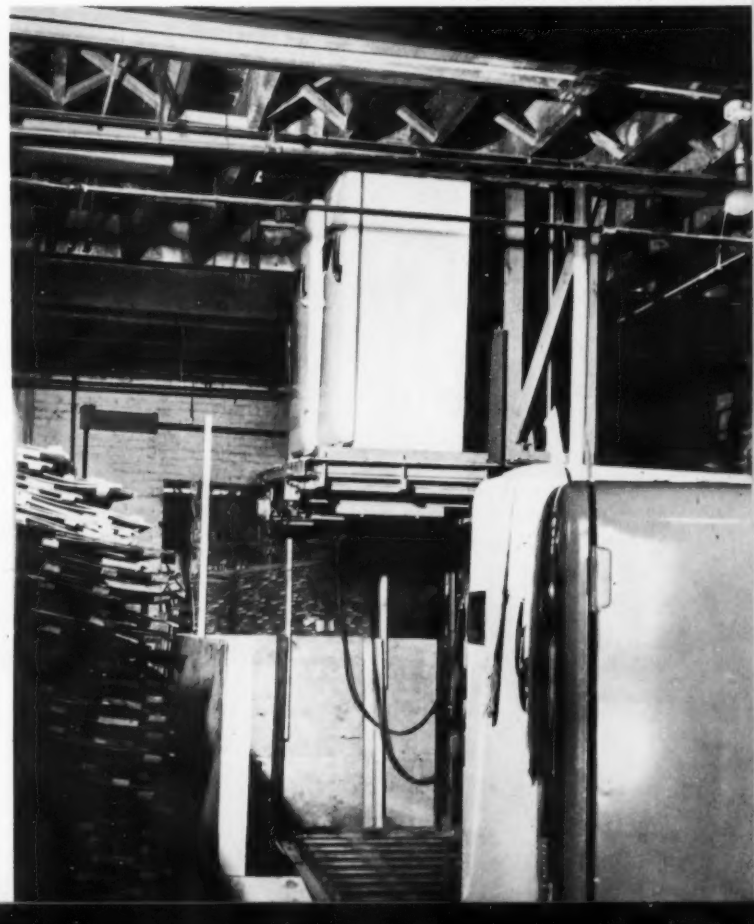
PHOTO COURTESY GAYLORD CONTAINER CORP.

Fresh'nd-Aire room coolers — *made by Cory Corporation, of Chicago — are shipped in heavy-duty containers which are composed of three pieces, with upper and lower lids which fasten securely to the container body through interlocking flanges and horizontal steel strapping. The bottom lid is sandwiched betwen skid members to permit fork truck lifting, and the basic structure is strengthened by an inner corrugated sleeve and vertical corner pads.*

Plant modernization program — *at Quicfréz, Inc., of Fond du Lac, Wis. — has facilitated the movement of finished appliances between floors of their factory. Shown here is an electric freight elevator in operation between floors. The elevator motor can lift or lower the platform at the rate of 39 feet per minute.*

PHOTO COURTESY WEST BEND EQUIPMENT CORP.



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and Stack 'em High As You Like

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How large domestic heating units are packaged at Weil-McLain

packing time for 768-pound domestic boilers takes 4.8 man-minutes per unit

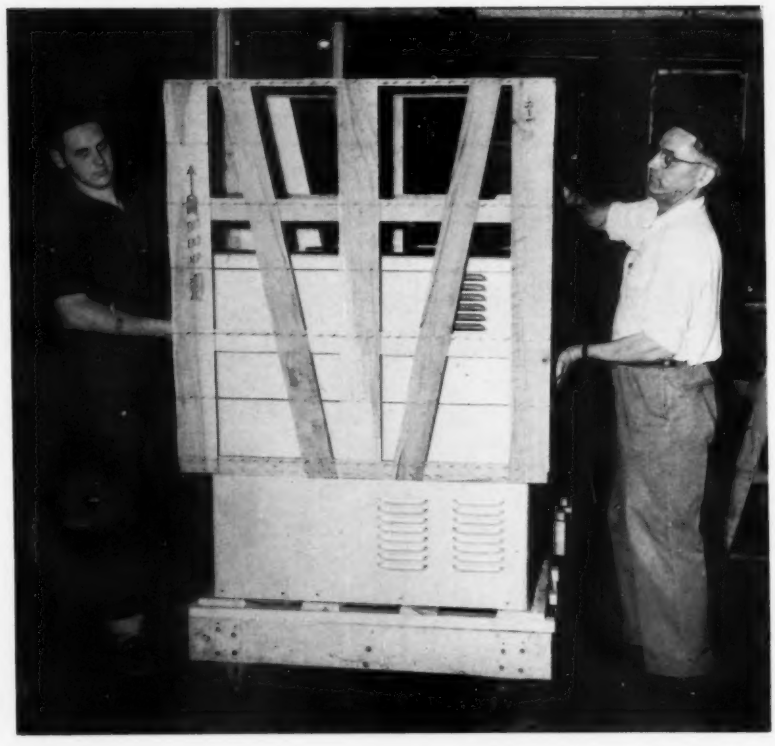
EXPERIENCE in packing heating equipment and similar products guided engineers of Weil-McLain Co., Michigan City, Ind., directly to solving packing problems presented when the company introduced its "packaged" 768-pound P-OB15 domestic unit boiler.

The requirements were for a shipping container that would permit the new unit to be shipped completely assembled, small enough to be taken through ordinary basement or utility room doors by installing contractors, strong enough to permit high stacking, and thoroughly protective against damage to the contents from ordinary shipping shocks and jars. Economy of packing and ease of handling naturally were influencing factors.

Above: Domestic boiler heating units, completely assembled on crate bases, are shown on the assembly line in Weil-McLain plant in Michigan City, Ind. The skid-type base permits easy handling by industrial power truck and safe high-stacking in warehouse.

In designing the crate for the new domestic unit boiler, the engineers drew upon the long Weil-McLain

Right: A hood, pre-formed by folding into shape a one-piece blank that comprises the four sides of the crate, is slipped over 768-pound heating unit, which is completely assembled except for controls and a few fittings. They are packed in cartons placed inside the unit.

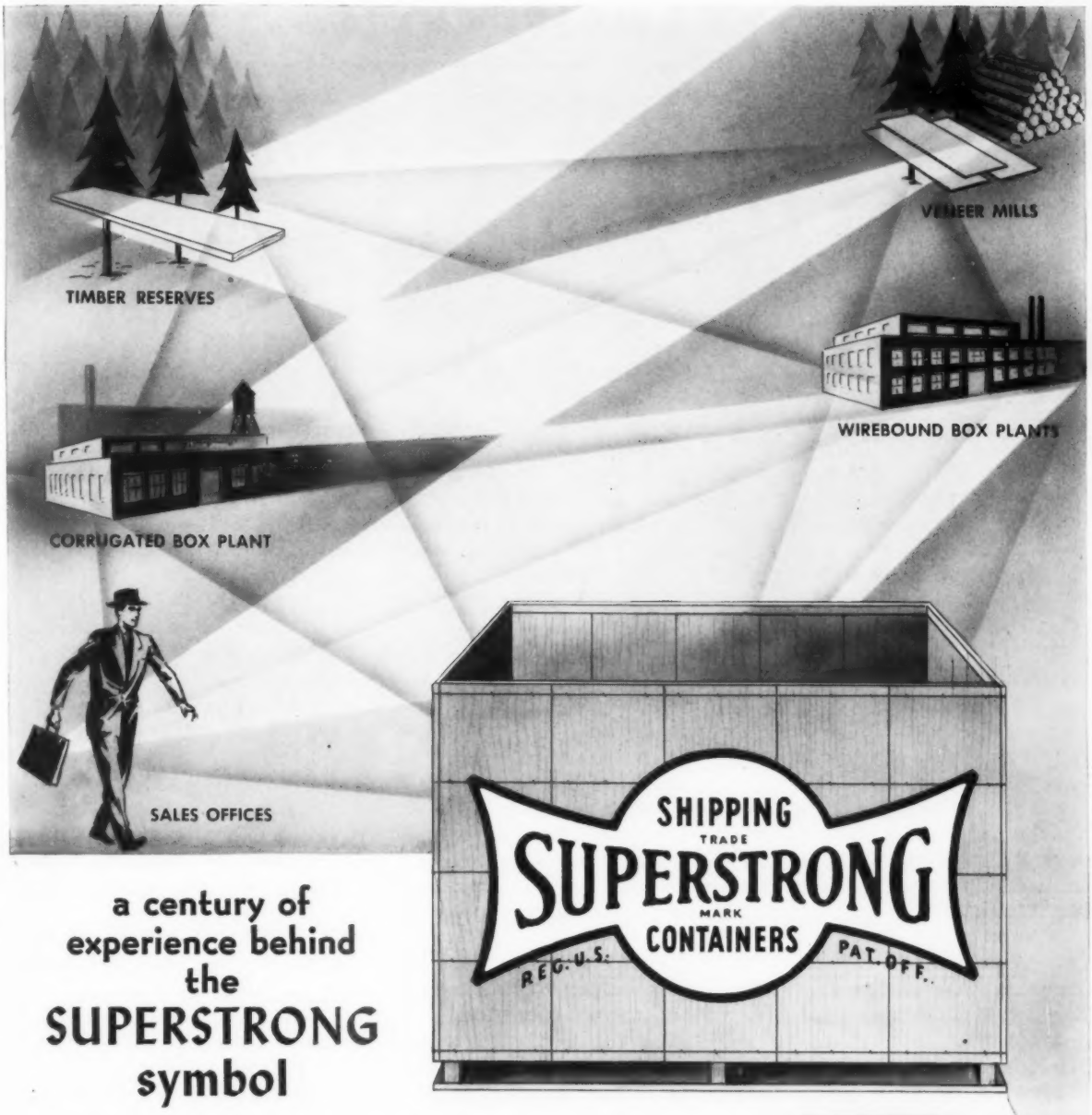


experience with wirebound crates and boxes for heavy products. The company uses 36 different designs and sizes of shipping containers to pack boiler and furnace parts, including heavy castings.

For accounting purposes, packing time charged against the P-OB15 unit is computed at 4.8 man-minutes per unit, according to William B. Misch, plant manager.

When assembly of the unit is completed, unattached controls and fittings are packed in cartons and placed inside the unit. The crate and top are placed in position and nailed. The shipping weight of the 768-pound boiler is 827 pounds.

Below: Mel Swanson, purchasing agent for Weil-McLain, is shown in warehouse area where boxes and crates are stored before use. Thirty-six different sizes and designs of boxes and crates are used to ship heating equipment and parts.



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SAFE TRANSIT NEWS

NATIONAL SAFE TRANSIT COMMITTEE

Associations Building, 1145 - 19th St., N. W., Washington 6, D. C.

New Certifications - The following companies are the newest participants in the National Safe Transit Program:

Berger Manufacturing Division, Republic Steel Corporation
Canton, Ohio
Fairbanks, Morse & Co., St. Johnsbury, Vermont
Gasinator Manufacturing Co., Cleveland, Ohio
James, Inc., Independence, Kansas
Lovell Manufacturing Company, Erie, Penna.
Raytheon Manufacturing Company, Waltham, Mass.
Simonds Abrasive Company, Philadelphia, Penna.
State Stove & Manufacturing Company, Nashville, Tenn.
Stolper Steel Products Corporation, Menomonee Falls, Wisc.
Welbilt Stove Company, Inc., Maspeth, Long Island, New York
Westinghouse Electric Corporation, Raleigh, North Carolina

- - - - -

Safe Transit Label - Use of the Safe Transit label soared to a new high last month with over a million products bearing the red and yellow emblem of participation in the Safe Transit Program. The label has had a tremendous effect upon carrier groups who are conducting continuing campaigns to acquaint handling personnel with the story of the pre-shipment testing program for which it stands. Implying no connection with tariffs, freight rates, claim procedures or any other existing transit regulations, the label has won the attention of these departments of transportation as representative of the manufacturer who has done his part to assure safe delivery of his products. As new manufacturers come into the Program the label is used in increasingly greater numbers with a correspondingly greater impact upon retailers and distributors, as well as carrier personnel.

- - - - -

Association of American Railroads - Since its very beginning the National Safe Transit Program has had the support of the Association of American Railroads. Through bulletins, posters, and their publication, "Perfect Shipping News", this organization continues to publicize the activities of the Committee. Mr. Frank Gibson, of the Association of American Railroads, in a recent visit to the NST offices said that the Safe Transit Program will again be featured in the quarterly training seminar. "I begin my talks" he said, "by flashing the Safe Transit label on a screen. Then I discuss each of the pieces of literature that has been provided by the Committee and distributed to those in attendance."

- - - - -

New Test Procedures Booklet Available - The National Safe Transit Committee will have available for distribution this month a new 8-page booklet on the Test Procedures for Project 1 and Project 1A. Project 1 covers the Test Procedures for packaged products weighing from 100 lbs. to 1,000 lbs. and Project 1A, packaged products under 100 lbs. Project 1B, also available in an 8-page booklet, covers the Test Procedures for pre-shipment testing of basic carloading. Both publications are available at 25¢ per copy and may be obtained by writing the Committee's Washington offices.

- - - - -

Headquarters Office Moves - The National Safe Transit Committee has moved its Washington offices to The Associations Building, 1145 Nineteenth Street, N. W., Washington 6, D. C. The Associations Building is also the headquarters for the Committee's sponsoring organization, The Porcelain Enamel Institute, and other national trade associations.

- - - - -

Wirebound
Nailed or Hinge Corner
Cleated Plywood
Cleated Craveneer
Cleated Corrugated
Watkins Type Containers
Shop and Tote Boxes
Woodsteel Nesting Boxes
★
FOR DOMESTIC OR EXPORT
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A shipping container for every shipping purpose

Sending your crated product through the Chicago Mill and Lumber Company Laboratory is like taking out an insurance policy for safe delivery.

Experienced engineers and crate designers use the latest in testing equipment in search for weakness that may result in transit damage to your valuable finished products. Assurance of safe arrival will result from pre-shipment testing in our National Safe Transit certified laboratory. Avail yourself of this service.

FOR SAFER TRANSIT BY • TRUCK • BOAT • TRAIN • PLANE

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Plants at: Helena, Arkansas • Greenville, Mississippi • Rockmart, Georgia
Tallulah, Louisiana • South Fork, Colorado • Chicago, Illinois

SINCLAIR NAMED PAC SECY.

Denman Sinclair of Toronto has been appointed merchandising services secretary of Packaging Association of Canada, it has been announced by C. R. Cornell, general manager.

MATERIALS HANDLING EXPOSITION, MAY 16-20

A conference on materials handling techniques will be held in conjunction with the National Materials Handling Exposition at the International Amphitheater in Chicago, May 16-20.

The announcement was made jointly by the American Material Handling Society, which will sponsor the conference, and Clapp & Poliak, Inc., New York exposition firm.

The Chicago section of the society will prepare the program. D. A. Gillespie, society president, has appointed L. J. Riege, materials handling engineer, United States Gypsum Co., Chicago, as chairman of the conference.

More than 200 companies will exhibit at the show.

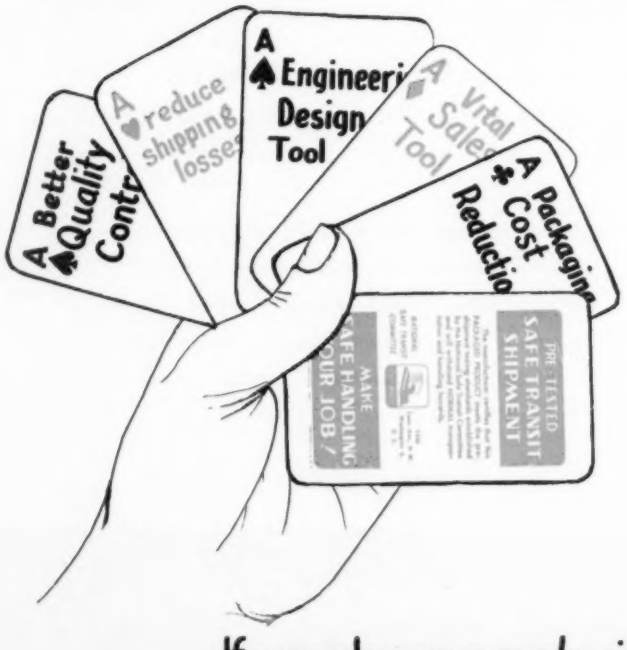
TWIN CITIES CONTAINER APPT.

M. F. Ritchie, president, Twin Cities Container Corp., has announced the appointment of J. Lloyd Weaver as vice president in charge of production of the container plant at Coloma, Michigan.

SAFE TRANSIT ARTICLE IN QUALITY CONTROL MAGAZINE

"Pretesting Packaged Products for Safe Transit — a Vital Phase of Quality Control", an article by R. F. Bisbee, Westinghouse Electric Corp., Mansfield, Ohio, appeared in the November, 1954, issue of *Industrial Quality Control.*

The
National Safe Transit Program
Can Work For You


A Better Quality Contr
A reduce shipping losses
A Engineeri Design Tool
A Vital Sales Tool
A Packaging Cost Reductio
PRE-TESTED SAFE TRANSIT SHIPMENT
MAKE SAFE HANDLING YOUR JOB!

If you play your cards right
There's a profit, too.

EIGHTEEN RAILROADS USE PREVENTION CARS

A survey has developed that the following railroads and the Department of the Navy have loss and damage prevention instruction cars or impact demonstration cars for use in training personnel: Department of the Navy; Atchison, Topeka & Santa Fe; Canadian National; Chicago & North Western; Delaware, Lackawanna & Western; Gulf, Mobile & Ohio; Missouri Pacific; New York Central; New York, New Haven & Hartford; Pennsylvania; Reading; St. Louis — San Francisco; Seaboard Air Line; Southern; Southern Pacific; Texas & Pacific; Union Pacific; Wabash; and Western Pacific.

NAM TV SHOW FEATURES CORRUGATED BOARD INDUSTRY

A salute to the corrugated board industry and the men who make the machinery for it will be seen on the nationally televised program of the National Association of Manufacturers.

The film will be on program #291 of the NAM show. This is shown at different times by television stations throughout the U. S.

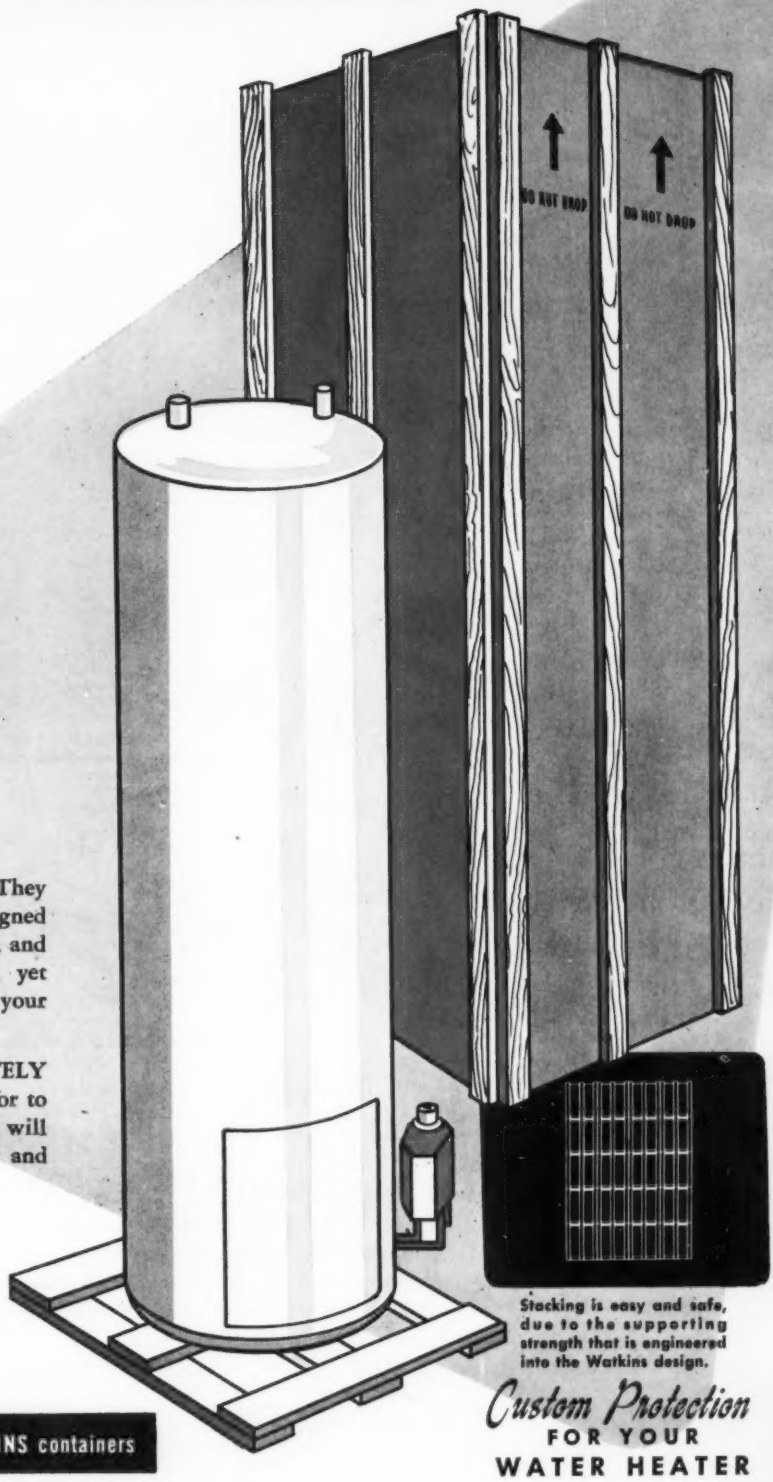
ACME STEEL PROMOTES MOORE

Frederick M. Gillies, president, Acme Steel Co., Chicago, has announced the appointment of Allan N. Moore to manager of the traffic department, succeeding S. L. Felton, who has retired.

GAYLORD'S SPIEGEL HEADS SOCIETY

Edwin J. Spiegel, president, Gaylord Container Corp., St. Louis, Missouri, has been elected president of the St. Louis Symphony Society, which operates the St. Louis Symphony Orchestra. The orchestra is in its 75th anniversary season.

WATKINS has the container for your shipping problem



Stacking is easy and safe, due to the supporting strength that is engineered into the Watkins design.

Watkins Containers will cut your shipping costs. They are delivered to your factory 75% assembled and designed for quick and easy completion, to save you labor, time, and expense. Scientific design gives maximum strength, yet keeps container weight at a minimum and reduces your shipping costs.

In a Watkins Container your product is COMPLETELY protected enclosed 100% by a smooth, staple-free interior to safeguard fine finishes and to keep out dust and dirt. It will carry safely, you can stack to any practical height, and resistance to "weaving" and shock is assured.

Only Watkins Containers provide all of these many desirable and necessary features and at no greater cost than other types of containers. Ship your carefully manufactured products safely and economically—ship them the "Watkins Way."

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FOR YOUR
WATER HEATER

these companies build WATKINS containers

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Crate-Rite Mfg. Corp., Division of Pacific Parts Ind. Inc. ..... 10901 Russett Street, Oakland, California
Dura-Crates, Inc. ..... 940 East Michigan Street, Indianapolis, Indiana
General Box Co. ..... 1825 Miner St., Des Plaines, Illinois, and 16th and Maple Sts., Louisville, Kentucky
Hemb & Martin Mfg. Co. ..... P. O. Box 108, Murfreesboro, Tennessee
Illinois Box & Crate Co. ..... 811 Center Street, Plainfield, Illinois
Kieckhefer Box & Lumber Co. ..... 1715 West Canal Street, Milwaukee, Wis.
Lane Container Corp. ..... 10212 Denton Road, Dallas, Texas
Lewisburg Container Co. ..... 243 Singer Street, Lewisburg, Ohio
Livingston Wood Manufacturing, Ltd. ..... Tillsonburg, Ontario, Canada
Love Mfg., Inc. ..... 608 South Commerce Street, Wichita, Kansas
Pennsylvania Box & Lumber Co. ..... 2331 N. Bodine St., Philadelphia 33, Pa.
Utility Crate Corporation ..... 1985 E. 16th Street, Los Angeles 21, California

—an inquiry to any of these companies will get prompt attention—

The · WATKINS CONTAINER · Manufacturers

LEE HEADS TAPE COUNCIL

It has been announced that Clarence I. Lee, Sanette Mfg. Co., is president of the Pressure Sensitive Tape Council.

NATIONAL PACKAGING EXPOSITION, APRIL 18-21

About 30,000 business executives are expected to attend the American Management Association's 24th National Packaging Exposition, to be held April 18-21 in the New Exposition Hall and the South Hall of the International Amphitheatre, Chicago.

Concurrently, a Packaging Conference will be held in the Palmer House in Chicago.

SAFE TRANSIT COMPANY CERTIFICATIONS NOW TOTAL 188

new certifications include Fairbanks-Morse, Gasinator, James, Lovell, State Stove, Stolper Steel Products, Welbilt Stove

The National Safe Transit Committee has announced that the following new certifications have brought the total of NST-certified companies to 188:

Fairbanks, Morse & Co., St. Johnsbury, Vt.; Gasinator Mfg. Co., Cleveland, Ohio; James, Inc., Independence, Kansas; Lovell Mfg. Co., Erie, Pa.; State Stove & Mfg. Co., Nashville, Tenn.; Stolper Steel Products Corp., Menomonee Falls, Wis.; and Welbilt Stove Co., Inc., Maspeth, Long Island, N.Y.

TWO NEW SIPMHE CHAPTERS

Two new divisions of the Society of Industrial Packaging and Materials Handling Engineers, recently have been formed, according to Earl B. Candell, president, bring to a total of 18 the number of SIPMHE chapters. The two new groups are the southwestern division, covering Texas, and the central Pennsylvania division, covering the Harrisburg, Pa., area.

PALLET STANDARDIZATION PROJECT MOVES FORWARD

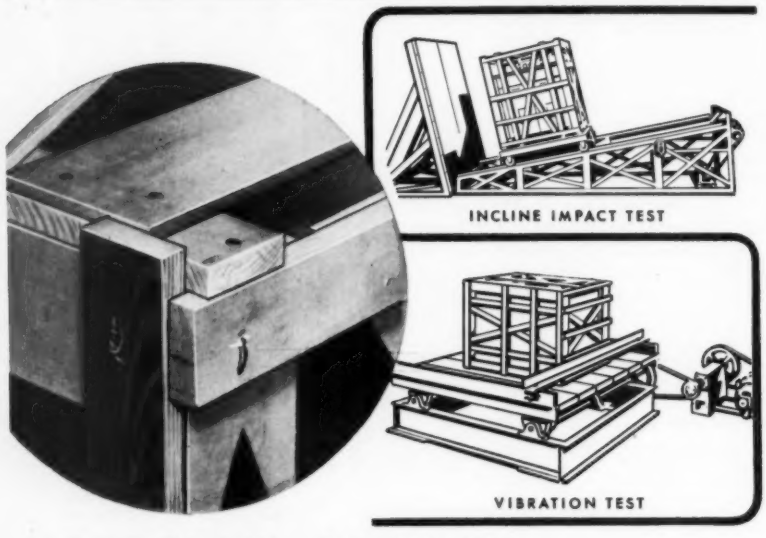
Work of Committee B-69, the Pallet Standardization Committee of the American Standards Association, has been further advanced with the appointment of J. E. Wiltrakis, Western Electric Co., New York, as chairman of the Technical Committee.

KIECKHEFER BUYS DIVISION OF CORNELL PAPERBOARD

Kieckhefer Box & Lumber Co., Milwaukee, Wisconsin, has purchased the Wood Cleated Box Division, Cornell Paperboard Products Co. of the same city. Cornell remains in the container business but they will no longer produce wood cleated boxes or Watkins type containers. Kieckhefer has taken over the sale and manufacture of these products.

DAILEY TO NATIONAL CONTAINER

William Dailey has joined National Container Corp. in a sales capacity at the national accounts office in New York City.



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● B-G Containers are SCIENTIFICALLY ENGINEERED and TESTED in our new, modern laboratory, APPROVED by the NATIONAL SAFE TRANSIT COMMITTEE.

● B-G Unique TIGHT CORNER feature makes possible a sturdy, collapsible hinge container assuring GREATEST ECONOMY in your shipping, handling and storage problems.

● B-G Tight Corner Containers are INDIVIDUALLY ENGINEERED to fit your product.

● B-G invites your inquiries for further information. Sales engineer will call upon request.

● B-G offers without obligation the benefits of 30 YEARS EXPERIENCE in DEVELOPING BETTER, STRONGER and more EFFICIENT Shipping and Storage CONTAINERS.

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General Office and Laboratory 320 W. HURON STREET • CHICAGO 10, ILLINOIS

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ST-12

Newport Steel's new cold rolling mill

new reversing cold mill opened for regular production gauges and finishes specified for appliances and automobiles

A FRESH source of supply for cold rolled sheet steel was provided with the opening, January 26, of Newport Steel Corporation's new reversing cold mill. (The Wilder, Kentucky, mill was first test run November 30, 1954.)

At Newport Steel, strip is hot rolled directly from ingot into finished coil in one straight line operation. With the new facility Newport can now convert these hot rolled coils into cold rolled sheets to the gauge and finish specified by appliance manufacturers, the automobile industry and other similar users of steel.

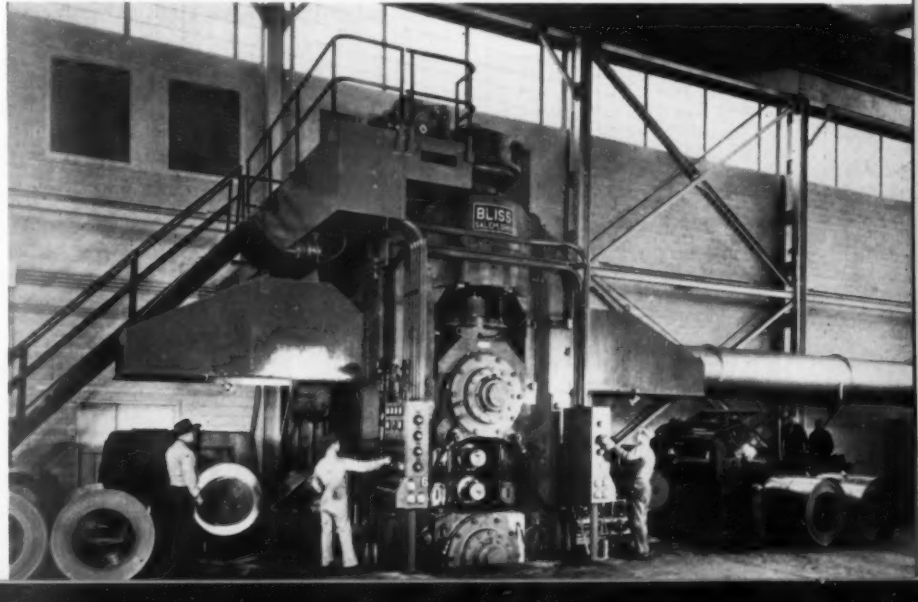
A major item in a $9,000,000 expansion and modernization program that has been underway at Newport Steel, the new mill features a cold reversing stand which, with strip speeds up to 1,700 feet per minute, can reduce hot rolled pickled coils to desired gauge in coil widths for shearing into flat sheets up to 48 inches wide.

Robert E. Harvey, executive vice president and general manager, reported that initial orders were on hand and in process of production.

According to L. E. Wolfson, president and chairman, the start of production of cold rolled steel reflected some of the progress achieved to date in plans announced by Merritt-Chapman & Scott when it acquired Newport Steel last March (1954) to expand the latter's operations and to broaden the list of products.

Carl M. Riefkin, vice president for sales, pointed out that completion of the cold rolling mill, plus recent installation and modernization of other facilities, now placed Newport Steel

New reversing cold mill is shown at lower left in aerial view of Newport Steel's Wilder, Ky., facilities. Photo below shows the mill which features a 4-high stand, with strip speeds up to 1700 fpm. After cold rolling, coils go to continuous flying shear where the steel is uncoiled, flattened, and cut to proper lengths and widths (up to 48" wide).



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Laboratory Manager

Expanding development laboratory facilities. We need an Engineer to establish and manage new range and laundry equipment laboratory in Detroit engineering staff. Salary commensurate with ability and experience. Address reply to:

Manager of Salaried Personnel, Kelvinator Division of American Motors Corporation, 14250 Plymouth Road, Detroit 32, Michigan.

→ *from Page 101*

in position to provide its customers with a wide range of both hot and cold rolled steel products. The list includes cold rolled sheets, hot rolled sheets and coils; hot rolled pickled sheets and coils; electrical sheets; galvanized, galvannealed and colorbond sheets; alloy sheets and plates and pipe and building products.

Erected by Merritt-Chapman & Scott's industrial and building construction division, the new cold rolling mill was built as an extension to the plant unit housing the continuous pickling line.

MAREMONT CHAIRMAN OF THOR

Arnold H. Maremont, president, Maremont Automotive Products, Inc.,

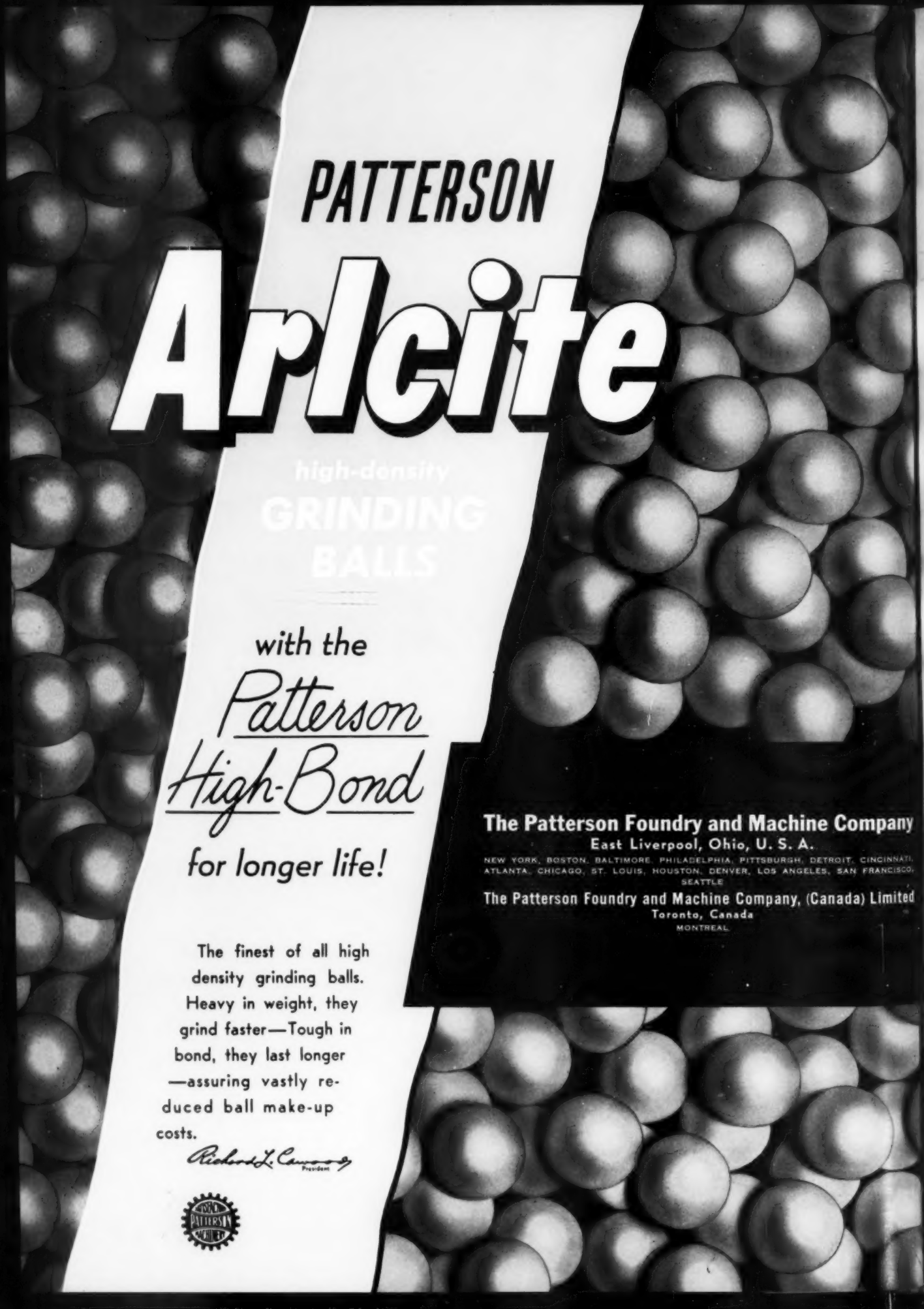
has been elected chairman of the board of Thor Corp., succeeding Raymond J. Hurley, who resigned in April, 1954.

April • 1955

finish

THE MAGAZINE OF
Appliance AND
Metal Products MANUFACTURING

FROM RAW METAL TO FINISHED PRODUCT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BALLS
with the
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The Patterson Foundry and Machine Company, (Canada) Limited
Toronto, Canada
MONTREAL

Even whirling roller skates won't mar the beauty of PORCELAIN ENAMEL

Years of hard service can't equal a test like this. It shows that *porcelain enamel* stands up to the toughest wear—and still stays bright and beautiful.

If you want to give *your* products extra sales advantages that stand out in comparison with other finishes, make them of Armco Enameling Iron and attach a label bearing the widely-known Armco triangle trademark.

LIFETIME FINISH

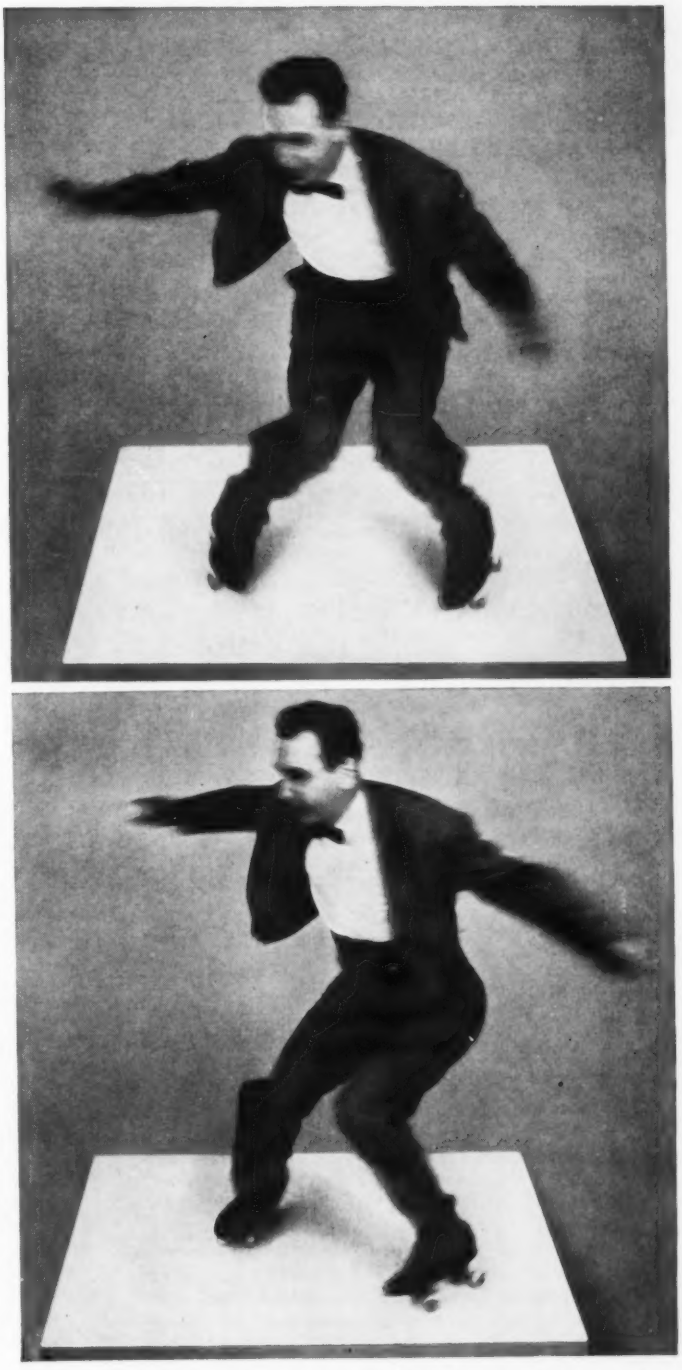
The combination of Armco Enameling Iron and fused-on minerals offers a *lifetime* finish. The handsome surface is not affected by time, rust and many other destructive elements. Acid resisting porcelain enamel is not damaged by fruit juices, alcohol or mild household cleansers.

There are no tiny surface pores in Porcelain Enamel to collect dirt and moisture. So stains and dirt are easy to wipe off. Colors never "fade out" even after years of service.

THE "WORLD'S STANDARD"

Armco Enameling Iron—produced for more than 40 years—is known as the "World's Standard." It possesses excellent fabricating properties that are *uniform from one shipment to the next.* Enamelers know what to expect. They consistently report a higher percentage of primes and fewer rejects with Armco Enameling Iron.

We'll be glad to send you complete information. Just write us at the address below.



***Spinning skates* fail to scratch or damage this porcelain enameled kitchen counter top. Underneath the lifetime finish is a special metal base—Armco Enameling Iron.**

ARMCO STEEL CORPORATION

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a practical approach to pressroom modernization

Announcing

TWO NEW Verson PLANS

to solve press obsolescence problems

The extensive capital expenditures required to meet competitive pressures have put many manufacturers in an unfortunate position. Modernization is necessary if the manufacturer is to price his product competitively and still make a fair profit. However, the fair profit is necessary before he can afford the modernization. Two new Verson plans make it possible to modernize now and pay for it out of the increased profits it provides. If you are one of the manufacturers faced with the dilemma of needing modernization for better profits, but needing better profits before you can afford modernization, one of these plans may be the answer to your problems.

Customized

INSTALLMENT PROGRAM

For the manufacturer who wishes to own his own presses but minimize his initial capital outlay, Verson offers a Customized Installment Program. It is called "Customized" because the payment plan is tailored to the buyer's own financial requirements rather than to a single fixed plan. Initial payments may be as low as 10 per cent of the purchase price with the balance payable over periods ranging from six months to five years. Further information on a plan to meet your needs will be furnished on request. Please outline your requirements.

Customized

LEASING PROGRAM

For the manufacturer who wants the advantages of modern, efficient presses without capital investment, Verson offers a Customized Leasing Program. Like the Installment Program, a choice of plans is available to best suit the buyer's requirements. In addition to the basic plans, options for continuation, termination and eventual purchase are also available. Special arrangements for special machines will be considered. Further information on a leasing plan to suit your needs will be furnished on request. Please outline your requirements.

A Verson Press for every job from 60 tons up.

Verson

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April • 1955

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A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. Includes technical and practical information on plant facilities and manufacturing problems from raw metal to safe delivery of the finished product, with special emphasis on fabrication, metal preparation, metal finishing, assembly, and packaging and shipping.

Free controlled circulation to management, purchasing, engineering and key plant personnel in metal product manufacturing plants. To others, subscription price is $5.00 per year, domestic. To all other countries $8.00 per year (U.S. funds).

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METAL PRODUCTS MANUFACTURING

ROM RAW METAL TO FINISHED PRODUCT

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[Advertisement]

IF YOU USE SET-UP WHEELS . . .

here are facts to prove you can save from $301 to $2184 *each* year at *each* set-up wheel station.

First, let's examine the upkeep costs of set-up wheels (rag wheels). In a survey just completed, set-up wheel users reported the cost of recoating these wheels to be from 12c to 32c each. These figures were for labor and material only. The survey also showed that one operator uses from 6 to 40 wheels every day.

Thus, taking an average recoating figure of 22c — a conservative figure of one operator using 10 wheels a day — and a 250-day production year . . . the yearly upkeep cost of set-up wheels for one operator amounts to $550.

To this cost must be added the replacement cost of worn out wheels. The survey showed that one operator will wear out a minimum of 60 set-up wheels in one year. At a replacement cost of $3, this adds another $180 to the total.

The total is now $730 — the cost per operator per year using set-up wheels.

There is another answer. Numerous on-the-job tests have proved that Nu-Matic Aircore Air-Inflated Grinding Wheels will handle the same production work assigned to set-up wheels — and will produce results that are somewhat superior.

How do Nu-Matic Wheels compare with set-up wheels on costs? When a Nu-Matic Grinder is used, the upkeep costs stem from the replacement of worn coated abrasive bands. A recent cost study made by one of the largest appliance manufacturers shows that they get three times more work finished with one abrasive band on a Nu-Matic Grinder as they used to from a similarly sized set-up wheel.

Thus, if an operation requires 10 set-up wheels a day, the same job will wear out approximately 3 abrasive bands each day — a total of 750 bands in one year. Figuring 60-grit glue bonded abrasive bands for a 5″ x 2½″ Nu-Matic Grinder, band cost varies between 17.3c and 24c depending on quantity purchased. Using an inbetween price of 21c, the yearly bill for abrasives would amount to $157.50.

There is one replacement item on a Nu-Matic Grinder — the contact drum. Two drums a month per operator is a high figure. This adds another $96 to the yearly upkeep costs. Adding these figures together we get a total of $253.50 — the upkeep cost per operator per year when a Nu-Matic Grinder is used.

What's the payoff? A yearly saving of $476.50 for each operator. One of our customers has 150 set-up wheel operators. We can save him $71,475.00 each year in *direct* costs alone. This represents a potential increase in net profits before taxes. Add to this the savings realized by the elimination of the overhead necessary to operate a set-up wheel recoating department.

If your direct cost for recoating each set-up wheel is greater than 15c (we have assumed 22c), then a searching examination of your set-up wheel operation is in order. Begin that examination with a set-up wheel vs. Nu-Matic Grinder cost comparison AT OUR EXPENSE. We will ship you a Nu-Matic Aircore Air-Inflated Grinder for a 25-day free trial period. Just send us a letter outlining the job requirements and the size set-up wheels you are using now. We'll do the rest.

Here's a tabulation of the above figures:

COMPARATIVE COSTS — SET-UP WHEELS VS. NU-MATIC GRINDERS

1 operator for 1 year = 250 working days

Set-Up Wheels	
Recoating wheels (10 a day) 2500 @ 22c	$550.00
Replacing worn out wheels 60 @ $3	180.00
	$730.00
Nu-Matic Grinders	
Abrasive bands (3 a day) 750 @ 21c	$157.50
Replacing contact drums (2 a month) 24 @ $4	96.00
	$253.50
SAVINGS (each operator — each year)	$476.50

As mentioned, the figures used in the above analysis are conservative. Actual savings will vary with YOUR recoating costs and the number of wheels YOU use each day. Here's a chart that shows possible savings when Nu-Matic Grinders are used instead of set-up wheels.

If daily number of set-up wheels used by one operator is:

If recoating cost per set-up wheel is:	10	20	30
15c	$301	$464	$684
20c	426	714	1059
25c	551	964	1434
30c	676	1214	1809
35c	801	1464	2184

These will be the yearly savings per operator using Nu-Matic Grinders.

NU-MATIC GRINDERS, INC.

8224-A Carnegie Ave. Cleveland 3, Ohio

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when you need to Watch Your "Temper"

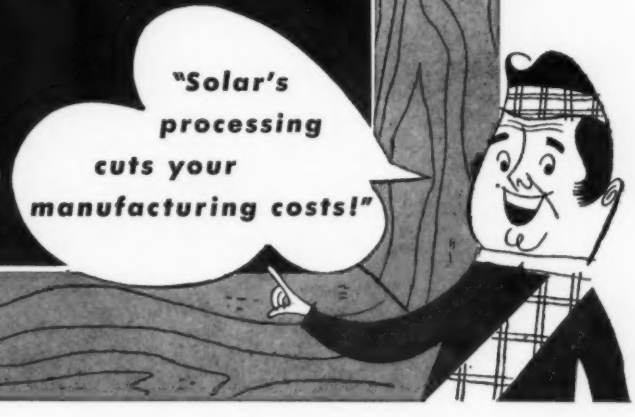
That's the time to let Solar furnish you with any commercial standard or special temper, from stock or by processing. The right temper makes for production increases.

when you want to Get the "Edge"

Just let a Solar warehouse do your Rounded, Beveled, Square or Special edging. Eliminate this step in your own manufacturing.

when it's the "Finish" that Counts

Solar warehouses do provide 10 standard finishes on flat rolled and bar products. The correct finish helps improve production.



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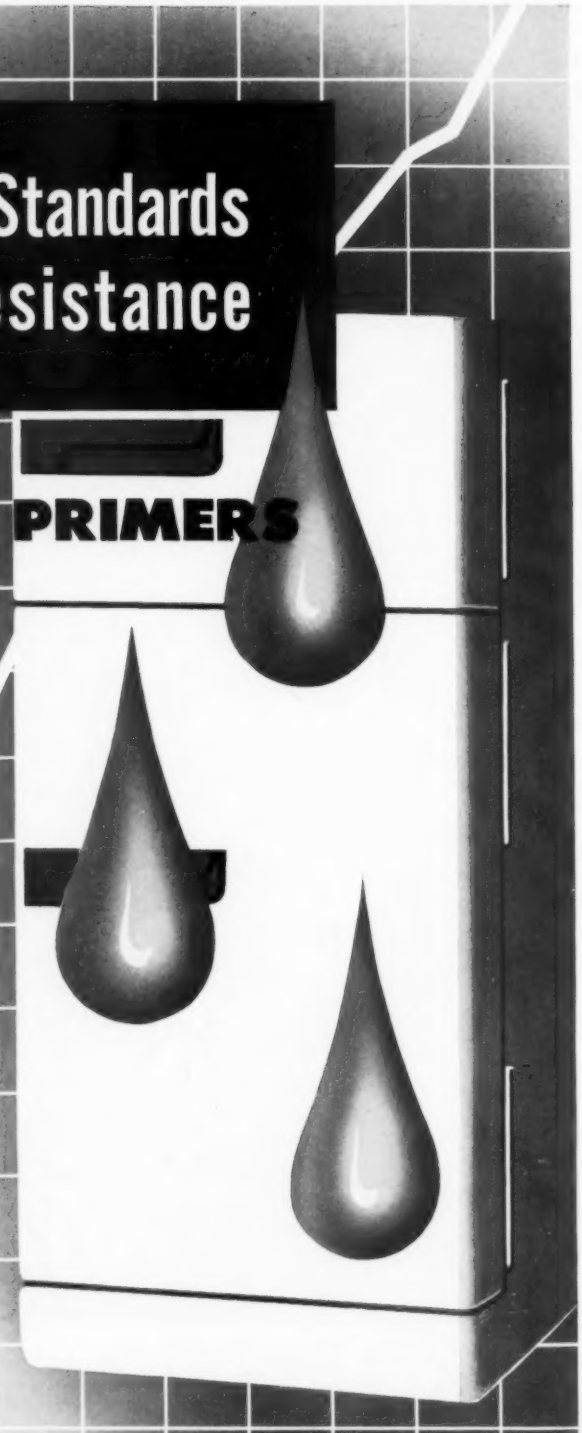

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In it rests the entire responsibility for ADHESION on which all other performance characteristics depend.

In it are the rust-inhibiting pigments or "galvanophobes" which destroy the eddy currents responsible for electrolytic corrosion.

It helps build film-thickness to improve general appearance and to fortify the impermeability of the system to water and oxygen — the two great allies of corrosion.

It adds toughness and durability because it may carry resins that would be prohibited in the top-coat by the limitations of color and gloss.

Whether you wish to air-dry or bake; spray, dip, or flow-coat; whether your substrate is ferrous or non-ferrous metal or plastic there is an INTERCHEMICAL CORROSION RESISTANT PRIMER to fill your need.

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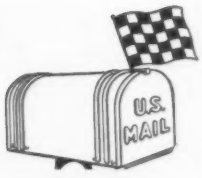


finish SUGGESTION BOX

Permanent magnets eliminate scrap in thin gauge metal fabrication

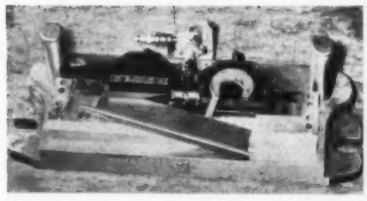
TWO permanent magnets, strategically located in the press die, have resulted in the elimination of scrap and guesswork in a piercing operation on thin gauge steel at Hart & Cooley Mfg. Co., Holland, Mich.

The company, which makes heating and air-conditioning registers, grills and diffusers, uses an 85-ton press to pierce holes in register frame sections. The holes are for positioning the register fins in a subsequent operation. In the press work, from 14 to 24 holes are punched in each frame simultaneously at each cycle of the press—depending on the size of the formed frame sections which vary in length up to 22 inches.

To do the work formerly, the operator picked up a frame section from a nearby totebox, positioned it against the die stop, then actuated the press with a foot pedal. If the alignment of the frame section in relation to the press punches was not always just right (due to vibration or other elements), scrap would result. It was bad enough to produce a scrap piece at this point, but the big damage came after man-hours were expended in welding the four sides of the register frame together and attempting to install the fins in mis-aligned holes —resulting in scrapping the whole assembly.

In an effort to overcome the situation, Hart & Cooley's production engineers, working with a supplier of magnets, re-designed the press die to hold two horseshoe-shaped magnets.

The magnets used were of the Alnico 5 type with a rated pull of 25 pounds against the proper steel keeper. These were mounted and clamped in the die, encased in non-magnetic blocks of fiber material. In other words, the whole magnet was insulated from the steel die except for the ends facing the die stop.



Press die used in punching operation. Magnet, left, is covered by non-magnetic cover. Magnet shape employed is shown at right, with frame member in position to show simplicity of set-up.

Production at press goes up

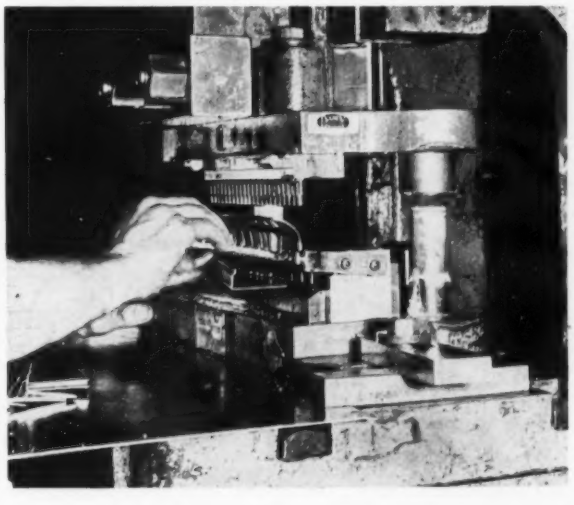
Scrap is no longer a problem. Furthermore, the permanent magnets simplified alignment of the frames to such an extent that production at the press has gone up.

In the operation today, the press operator simply positions the steel frame against a stop at the left end of the die. The pull of the magnets does the rest—snapping the part tightly against the die automatically, in perfect alignment with the press punches. An air-operated knockout automatically ejects the pierced piece.

Source for further information on these permanent magnets may be obtained by writing to *finish*.

First step in piercing operation at Hart & Cooley is positioning of register frame section in press.

Next the operator releases frame section which is snapped against die by the "pull" of the magnets.

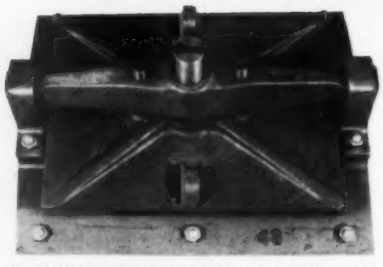


McDANEL

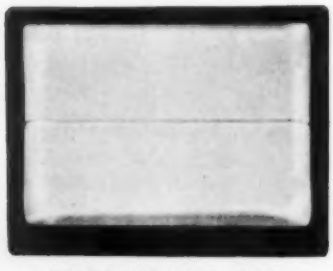
MILL HEAD ASSEMBLIES

COVER *all* METAL—keep batch pure

View of McDanel Special Frame Brick and Door Blocks



View of McDanel Combination Grinding and Discharge Door



Solid McDanel Door for Dry Grinding

● McDanel Mill Head Assemblies allow no metal to contaminate mill charge. Specially designed, overhanging-type frame brick and door block completely cover all metal parts. McDanel Mill Head Doors need not be removed to discharge when wet grinding. Replace grinding plug with perforated discharge plug for quick, easy discharge. No partially ground material around door can unbalance the batch uniformity. Dry grinding door is identically the same except for hole in the center. Your old doors can easily be replaced with new McDanel doors.

Write For Your McDanel Industrial Porcelain Catalog Today!

McDANEL *Industrial* PORCELAINS

McDANEL

REFRACTORY PORCELAIN COMPANY

BEAVER FALLS · PENNSYLVANIA

Our Ceramic Engineers have a big edge

We are reasonably sure that our laboratories for research and testing of frits are on a par with any other laboratory in the country. We are also reasonably sure that our ceramic engineers are among the top-flight men of the country.

then . . . comes the big Edge

We believe that any ceramic engineer will agree that after every possible exhaustive test in the laboratory there comes another test that is of equal importance . . . what happens under *practical* working conditions.

ING-RICH FRIT "The Plant Tested Frit"

Our Ceramic Engineers have the tremendous advantage of day in and day out contact with a practical proving ground.

Here, in our large porcelain enameling plant where we enamel our own products and also do a large job enameling business, our ceramic engineers are in daily contact with practical working conditions.

Out of our laboratories come a wide range of frits used on a wide range of products in our own enameling plant. Here, you have that rare combination of science working hand in hand, day after day, with old man practical experience. This "big edge" is paying off for our Frit Customers.

INGRAM-RICHARDSON, INC.

OFFICES, LABORATORY AND PLANT · FRANKFORT, INDIANA

Embarrassed? Man, I could cry!

"One day the Detrex man mentioned that metal cleaning and surface preparation represented from ¼ to ⅓ of the operations in most metalworking plants. Well sir, I just didn't believe him and took a count to prove him wrong—only I didn't! In fact when I think of the money I lost because I paid so little attention to the importance of these operations, I could really cry.

"In our plant over a quarter of the operations performed fell into one of these two categories. As a result, this metal cleaning business represents big money to us every year—even small savings on *each* operation represents mighty big savings overall. And mister, Detrex cut our costs on nearly every one.

"Take our phosphate coating operations prior to painting as an example. Detrex Paintbond* is saving us hundreds of dollars per year because it goes so much further. At the same time Paintbond gives us a finer crystalline coating and thus a smoother, more lustrous paint finish. Salt-spray tests? . . . better than ever.

"If you've never stopped to count the number of metal cleaning and surface treatment operations in your plant (or the money you might save on them) chances are you'll be shocked.

"Tell you what—the Detrex man in your territory will make the same kind of a survey in your plant. Why not give him a crack at it? You don't owe him a plugged nickel if he doesn't prove his point. What if he does?, you ask. Then he'll sell some chemicals and/or equipment and you'll save BIG dollars. How about giving it a whirl, today? You have everything to gain, nothing to lose."

**Above is shown the attractive three-color label which Detrex provides to users for application on finished products. At point-of-purchase, this label tells your customers that your product has a durable finish that will give a life time of pleasure. It's an added sales clincher every time.*

Service with a Saving!

DETREX CORP.

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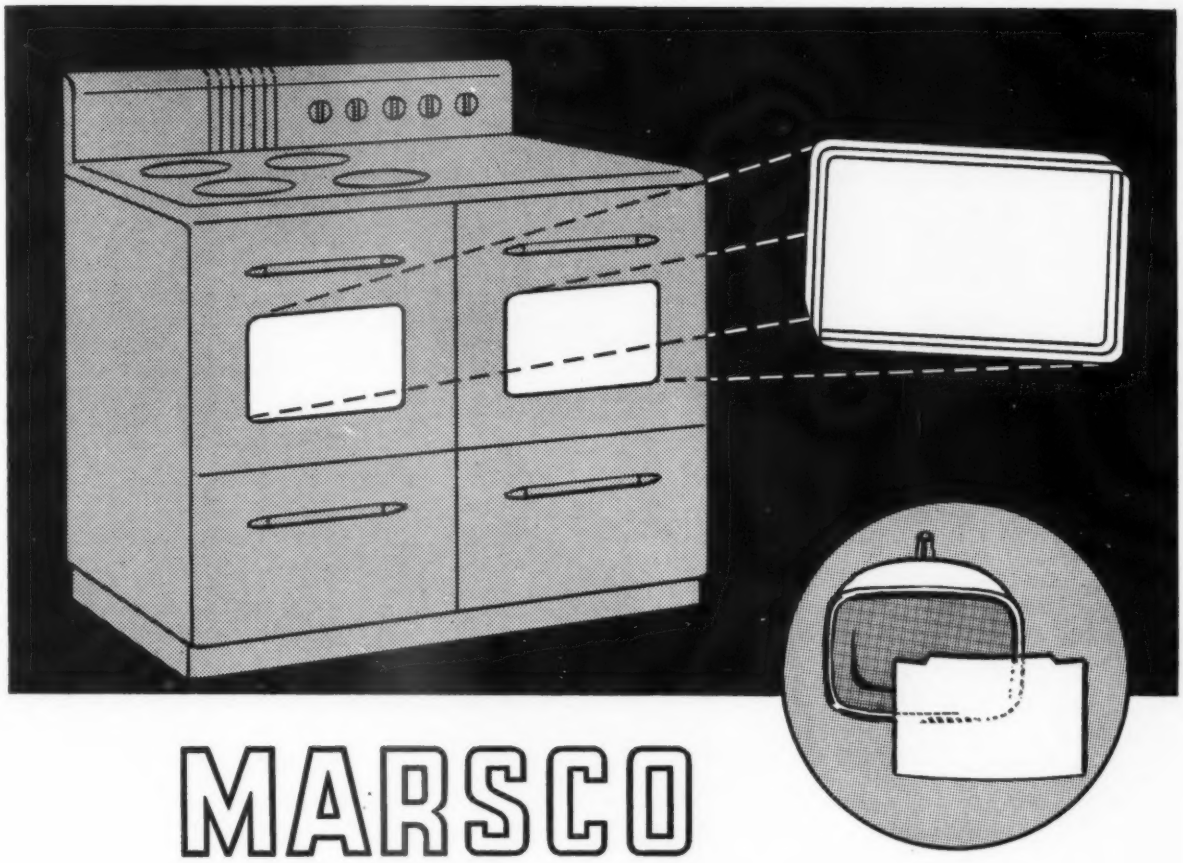

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precision glass parts

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Glass — adapted with skill and precision by MARSCO to meet your product requirements — For Today — For Tomorrow.

Glass — flat as can be — precisely shaped to fit.

Glass — bent — convex — drilled — to the most exacting tolerance.

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Join the major appliance manufacturers now enjoying extra sales from the appeal and prestige contributed thru the luster of glass — MARSCO'S Crystal Clear Glass.

Our engineers are experienced in incorporating glass as viewing windows in domestic appliances and television cabinets.
A simple request to us solves your problem.

Bent Glass

Convex Glass

Heat-treated Glass

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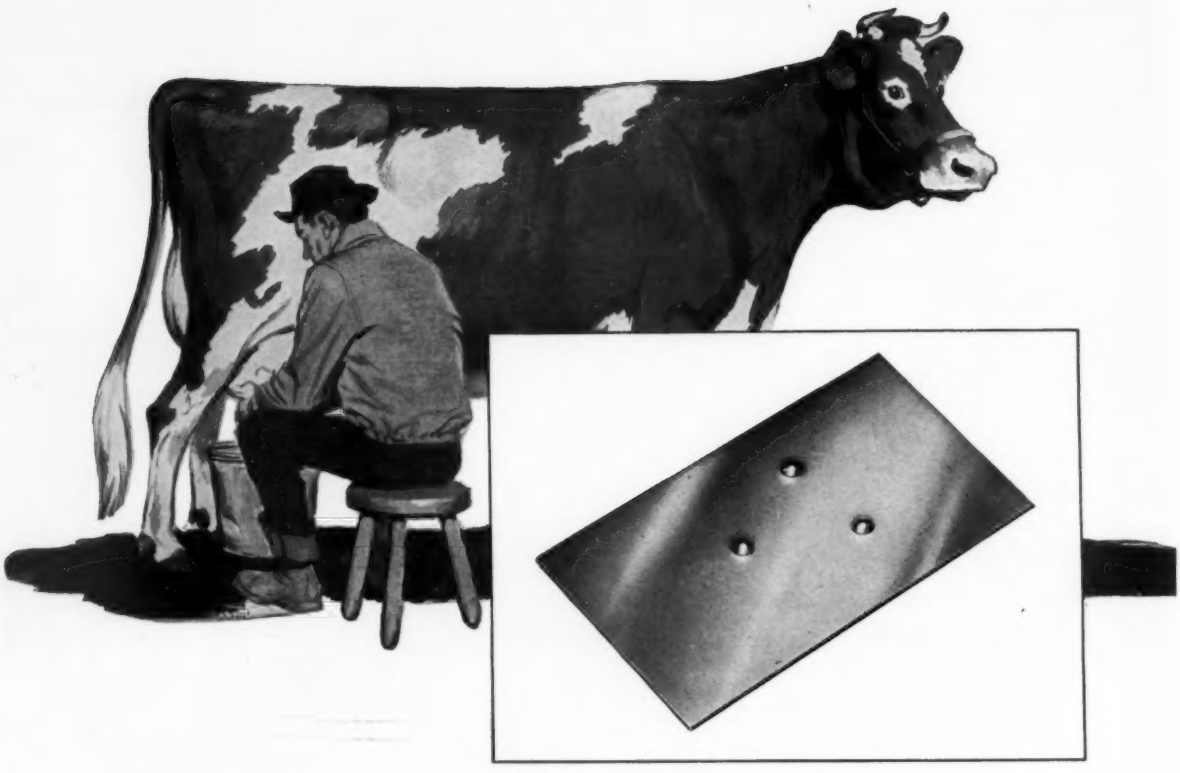
MARSCO MFG. CO., 2909 S. HALSTED ST., CHICAGO 8, ILL.



The bumper mount and the 3-legged stool

A case history of interest to any manufacturer who uses flat-rolled steel.

A little piece of steel like that shown above serves as an automobile bumper mount. Originally, this mount was to be projection-welded to the bumper at each of four points. But during the welding process, at the supplying manufacturer's plant, one point of the mount either refused to take the weld, or it broke easily under strain.

Time was running out. Production lagged and costs skyrocketed. And then a Great Lakes Steel Technical Service Representative was called in. He discovered that, regardless of how flat the rectangular mounting might be, it was virtually impossible to get a strong projection weld at all four corners. But when he eliminated one weld, the plate snuggled into the bumper and made perfect contact on three points—just like a three-legged stool! Three welds were actually stronger than four.

Solving problems is a tradition at Great Lakes Steel. As specialists in flat-rolled products, Great Lakes has had to come up with the right answers to problems in many fields. It will pay you to take advantage of this reservoir of experience next time you have a problem that concerns flat-rolled steel.

GREAT LAKES STEEL CORPORATION
Ecorse, Detroit 29, Mich. • A Unit of
NATIONAL STEEL CORPORATION

PRODUCER OF NAX HIGH-TENSILE STEEL

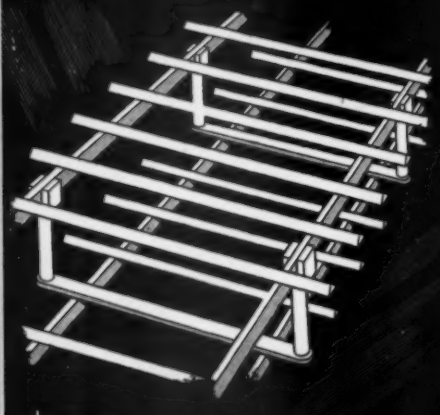
SALES OFFICES IN BOSTON, CHICAGO, CINCINNATI, CLEVELAND, HOUSTON, INDIANAPOLIS, LANSING, LOS ANGELES, NEW YORK, PHILADELPHIA, PITTSBURGH, ROCHESTER, ST. LOUIS, SAN FRANCISCO AND TORONTO

THE finish spotlight

This new Florence gas range features the "Governess"—a thermostatically controlled surface burner. As a fifth burner, it provides "top of the range" cooking temperatures for deep fat frying and pan frying. The homemaker determines at what temperature she will do her cooking and sets the dial. When the food in the cooking utensil reaches the dial setting, the gas flame automatically lowers and keeps the food at that temperature indefinitely. The range also features a rotisserie which fits into the waist-high broiler oven.

1920 FERRO 1955

A business grown big through SERVICE



1925

Ferro develops first alloy-metal, multiple-deck burning tool for firing cast-iron enamels.

1955

Joint research with burning-tool producers has improved life and performance, reduced weight 50%.

FERRO CORPORATION

cleveland · nashville · los angeles

IN CANADA: FERRO ENAMELS, LTD., OAKVILLE, ONT.

INDUSTRY MEETINGS

WORLD PLASTICS FAIR

World Plastics Fair & Trade Exposition, National Guard Armory, Exposition Park, Los Angeles, April 6-8.

PACKAGING EXPOSITION

American Management Association, national packaging exposition, International Amphitheatre, Chicago, April 18-21.

CERAMIC SOCIETY MEETING

American Ceramic Society, annual meeting, enamel division sessions, The Netherland Plaza, Cleveland, Ohio, April 24-28.

LP-GAS CONVENTION, EXHIBIT

Liquefied Petroleum Gas Association, annual convention and exhibition, Conrad Hilton Hotel, Chicago, May 1-4.

ENAMELER CLUB MEETING

Central District Enamelers Club, tour of Westinghouse plant, Columbus, Ohio, May 6.

PEI MID-YEAR CONFERENCE

Porcelain Enamel Institute, mid-year division conference, Edgewater Beach Hotel, Chicago, May 9-11.

MATERIALS HANDLING SHOW

National Materials Handling Exposition and Conference, International Amphitheatre, Chicago, May 16-20.

APPLIANCE TECHNICAL MEETING

American Institute of Electrical Engineers, annual appliance technical conference, Hollenden Hotel, Cleveland, Ohio, May 23-24.

DESIGN ENGINEERING SHOW

First Design Engineering Show and Conference (successor to Basic Materials Exposition), Convention Hall, Philadelphia, May 31-June 3,

KITCHEN CABINET MFRS. MEETING

Steel Kitchen Cabinet Manufacturers Association annual meeting, The Greenbrier, White Sulphur Springs, W. Va., June 2-4.

APPLIANCE INST. MEETING

Institute of Appliance Manufacturers, annual meeting and suppliers' exhibit, Netherland Plaza, Cincinnati, June 6-8.

AWS WELDING SHOW

American Welding Society, annual welding show, Municipal Auditorium, Kansas City, Mo., June 8-10.

INDUSTRIAL FINISHING SHOW

American Electroplaters' Society, annual convention and industrial finishing exposition, Public Auditorium, Cleveland, June 20-23.

SUMMER MARKET

Summer Homefurnishings and Appliance Market, The Merchandise Mart and the American Furniture Mart, Chicago, June 20-30.

NATIONAL HOUSEWARES SHOW

National Housewares and Home Appliance Manufacturers Exhibit, Auditorium, Atlantic City, July 11-15.

ENAMELERS SHOP FORUM

Porcelain Enamel Institute, annual shop practice forum, Ohio State University, September 14-16.

PACKAGING-HANDLING SHOW

Society of Industrial Packaging and Materials Handling Engineers, annual packaging and materials handling show, Kingsbridge Armory, New York City, September 20-22.

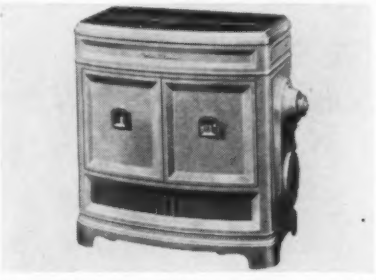
DOW CORNING CORPORATION

Silicone News

FOR DESIGN ENGINEERS

Silicone Paint on Space Heaters Gives Durable, High Style Finish

The trend to light, natural finish furniture has created a demand for home heaters that complement such furniture. To meet the demand, Duo-Therm of Lansing, Michigan, a leading manufacturer of space heaters, offers a "platinum" finish achieved by applying an off-white veiling over a buff colored, modified silicone coating.



Formulated by Glidden Company, the platinum finish is more durable than any organic finish. It easily passes Duo-Therm's life test of 500 consecutive hours at a surface temperature of at least 450 F. Under the same test conditions, light colored high temperature coatings based on organic resins discolor, crack and flake. The modified silicone coating shows no deterioration.

To increase customer satisfaction, Duo-Therm also applies a modified silicone-aluminum coating to the heat chambers of most of their heaters. Able to withstand temperatures in the range of 600 to 900 F, this silicone finish eliminates the smoking of organic coated heat chambers when they are first fired in the user's home.

Because it does not crack or peel in service, this modified silicone-aluminum coating is also applied to the stove body, flue and stack shield of the new Duo-Therm incinerator. The incinerator cover is coated with a straight silicone-based finish that withstands temperatures up to 1000 F with no discoloration or visible deterioration.

Duo-Therm sprays and cures silicone based coatings with the same equipment they use to apply organic based paints. Oven times and temperatures are also the same, ranging from 6 to 12 minutes at maximum temperatures of 450 F. ***No. 34***

Silicones Reduce Maintenance; Aid Designers of New Machines

In building a machine to meet high speed production requirements, the National Drying Machinery Co. of Philadelphia makes good use of three Dow Corning silicone products. Designed to be the fastest and most efficient festoon-type textile dryer and curing oven ever developed, the fully automatic "Model G" has an evaporative capacity of 16,000 pounds of water per hour. Speeds range up to 160 yards per minute per strand.

Much of the increased capacity of this new dryer is due to operation at temperatures up to 450 F. But in developing the unit, National designers found that such high operating temperatures presented problems not previously encountered. The wooden festoon-supporting poles or rollers used in ovens of this type, splintered and charred after a few weeks' service. Similarly, at 450 F, organic greases have very limited life and the prospect of frequent bearing failures in an otherwise expertly designed machine could not be tolerated.

National solved the roller problem by installing heat resistant, lightweight poles molded of a silicone resin-mineral composition. To prevent any possible moisture absorption and to provide a better gripping surface, the poles are coated with Silastic, the Dow Corning silicone rubber.

The rollers last indefinitely, but the gripping surface should be renewed after 6 to 12 months' service. National furnishes their customers with a Silastic compound that is easily applied and cured without removing the poles from the dryer.

The lubrication problem was easily solved with Dow Corning 41 Grease. Packed into the eight flange-type ball bearings in the conveyor system, this heat-stable silicone lubricant keeps bearings rolling at maximum operating temperatures for years without relubrication.

The selection of Dow Corning 41 was based on previous experience with this silicone grease in the bearings of National's HR-4 roll dryer. Bearings lubricated with organic greases and exposed to 450 F in the HR-4 failed in less than 6 months; 41 Grease has yet to cause a failure. ***No. 35***

Silastic Insulates Inductor Coil in High Temperature Electronic Unit

Washers fabricated from Silastic*, the Dow Corning silicone rubber, are major components in the new high-Q toroidal inductor developed by Vector Manufacturing Co. of Houston. Used to insulate the unit's doughnut coil from the case, Silastic also provides a heat-stable resilient cushion against physical shock. Tests indicate the Silastic washers retain their original excellent dielectric and physical properties after prolonged exposure to operating temperatures of 400 F.

Vector also makes use of the scrap Silastic left after the washers are stamped from sheet stock. They use the ground-up scrap to fill voids within the inductor case. Firmly packed, the macerated Silastic further cushions the coil; holds it securely in position; eliminates the need for supporting frames or braces. Because Silastic has a high order of thermal conductivity, the washers and packing also help to dissipate heat generated in the coil. ***No. 36***

*T. M. REG. U. S. PAT. OFF.

Revised listing of Silastic Fabricators names more than 80 rubber companies ready to make Silastic parts to your specification. *No. 37*

Design Edition 8

DOW CORNING CORPORATION - Dept. 5304
Midland, Michigan

Please send me more data on numbers:
34 35 36 37

NAME _____
TITLE _____
COMPANY _____
STREET _____
CITY _____ ZONE ___ STATE _____

ATLANTA • CHICAGO • CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEW YORK • WASHINGTON, D. C. (Silver Spring, Md.)
Canada: Dow Corning Silicones Ltd., Toronto; **England:** Midland Silicones Ltd., London; **France:** St. Gobain, Paris

In they go

Out they come

Year after Year on
Inconel *Hanger Rods*

Have you tried Inconel® for hanger rods?

For long run economy in this service, you can depend upon Inconel.

Within standard enameling temperature ranges (1475 to 1550°F.) and on up to the range where high temperature ceramic coatings are applied (1850°F. approximately), Inconel delivers excellent heat and corrosion resistance. It resists oxidizing and other corrosive conditions common in enameling operations.

At those temperature levels, Inconel retains high creep strength. Even after years of continuous operation, Inconel rods of proper design show no stretch.

A change to wrought, light-weight Inconel rods can mean lower fuel costs, too. For with less dead weight in the furnace, it takes less fuel to get to heat and stay there.

What's true of Inconel for drop rods, is equally true for burning tools and furnace parts.

So if heat and corrosion are creating problems with items of this type, see what Inconel can do. You can get more information by writing for "Keep Operating Costs Down . . . When Temperatures Go Up." It's free and a useful booklet to have. For detailed technical assistance, call on Inco's Technical Service Section.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

Inconel **INCO** TRADE MARK **Nickel Alloys**

. . . for long life at high temperatures

OHCO 900 Series of TITE-WITE FRITS, for low, medium and high fire

The OHCO 900 Series of Tite-Wite Frits, in combination with Hommel Oxides, produces better color for the appliances that help give color accent to modern kitchens.

These water quenched white Frits offer you economy combined with versatility, in being able to add oxides and develop your own individual colors.

In OHCO Tite-Wite Frits, you have assured color uniformity, scratch and acid resistance, with better gloss. Pieces can be spotted and they maintain color stability under repeated firings.

A Hommel representative will be glad to show you the advantages of the OHCO 900 Series of Tite-Wite Frits in your shop.

HOMMEL GRANULAR FRIT AND OXIDES

First in Quality...First in Sales!

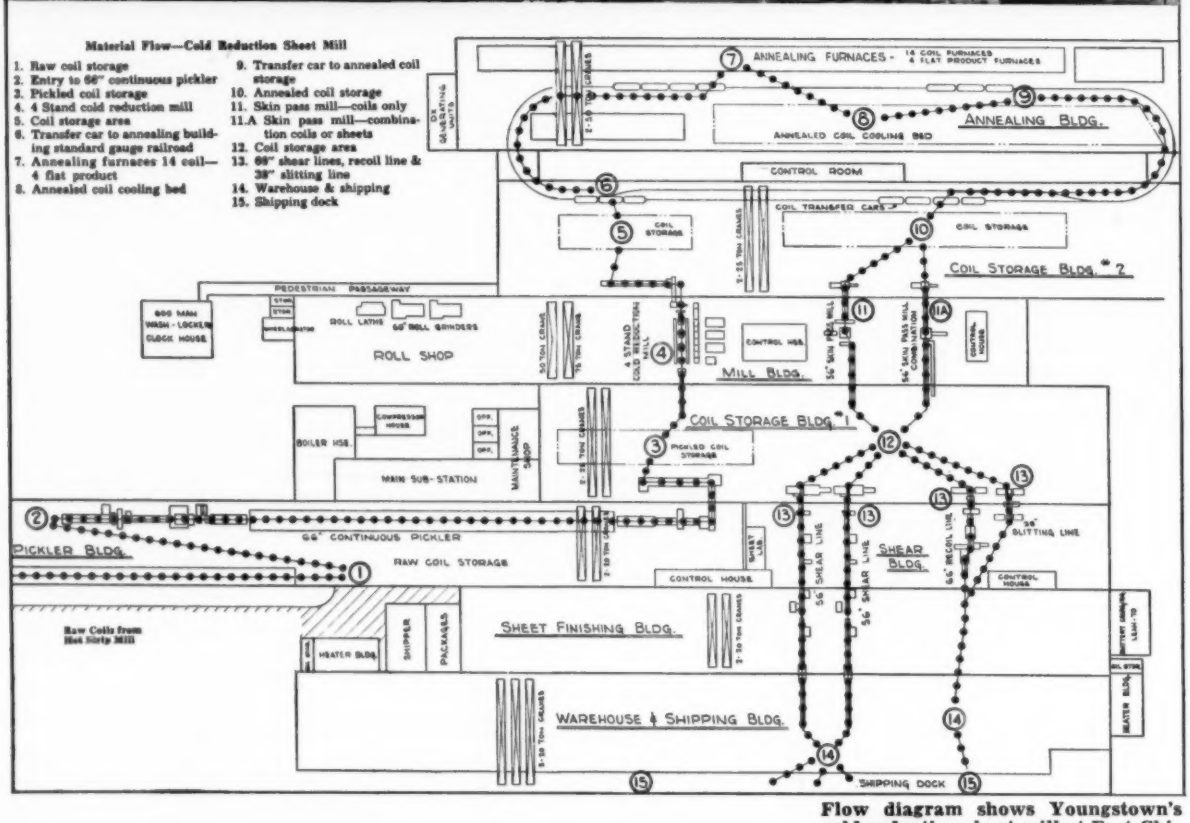
THE O. HOMMEL CO. PITTSBURGH 30, PA.

West Coast Warehouse, Laboratory and Office, 4747 E. 49th Street, Los Angeles, California

POTTERY • STEEL AND CAST IRON FRIT
CERAMIC COLORS • CHEMICALS • SUPPLIES
Our Technical Staff and Samples are available to you without obligation. Let us help with your problems.

World's Most Complete Ceramic Supplier

How we use 7 buildings to process quality into cold rolled sheets and strip


Material Flow—Cold Reduction Sheet Mill
1. Raw coil storage
2. Entry to 66" continuous pickler
3. Pickled coil storage
4. 4 Stand cold reduction mill
5. Coil storage area
6. Transfer car to annealing building standard gauge railroad
7. Annealing furnaces 14 coil—4 flat product
8. Annealed coil cooling bed
9. Transfer car to annealed coil storage
10. Annealed coil storage
11. Skin pass mill—coils only
11.A Skin pass mill—combination coils or sheets
12. Coil storage area
13. 66" shear lines, recoil line & 38" slitting line
14. Warehouse & shipping
15. Shipping dock
ANNEALING FURNACES
ANNEALING BLDG.
ANNEALED COIL COOLING BED
CONTROL ROOM
COIL STORAGE
COIL STORAGE BLDG. #2
ROLL SHOP
MILL BLDG.
COIL STORAGE BLDG. #1
MAIN SUB-STATION
66" CONTINUOUS PICKLER
PICKLER BLDG.
RAW COIL STORAGE
SHEAR BLDG.
SHEET FINISHING BLDG.
WAREHOUSE & SHIPPING BLDG.
SHIPPING DOCK

Flow diagram shows Youngstown's cold reduction sheet mill at East Chicago. These facilities mean customers can reduce inventories, get quick delivery on sheet and strip they need.

● Coils come rolling in from the hot strip mill. They've been carefully watched from the time they were ingots and slabs. Now, they're ready to be cold reduced. And the same care that went into making the original steel goes into each step of the process that takes place in these seven buildings. The result: the quality sheet and strip you always expect, and get, from Youngstown. And better fabricated products for you.

QUALITY · YOUNGSTOWN · SERVICE

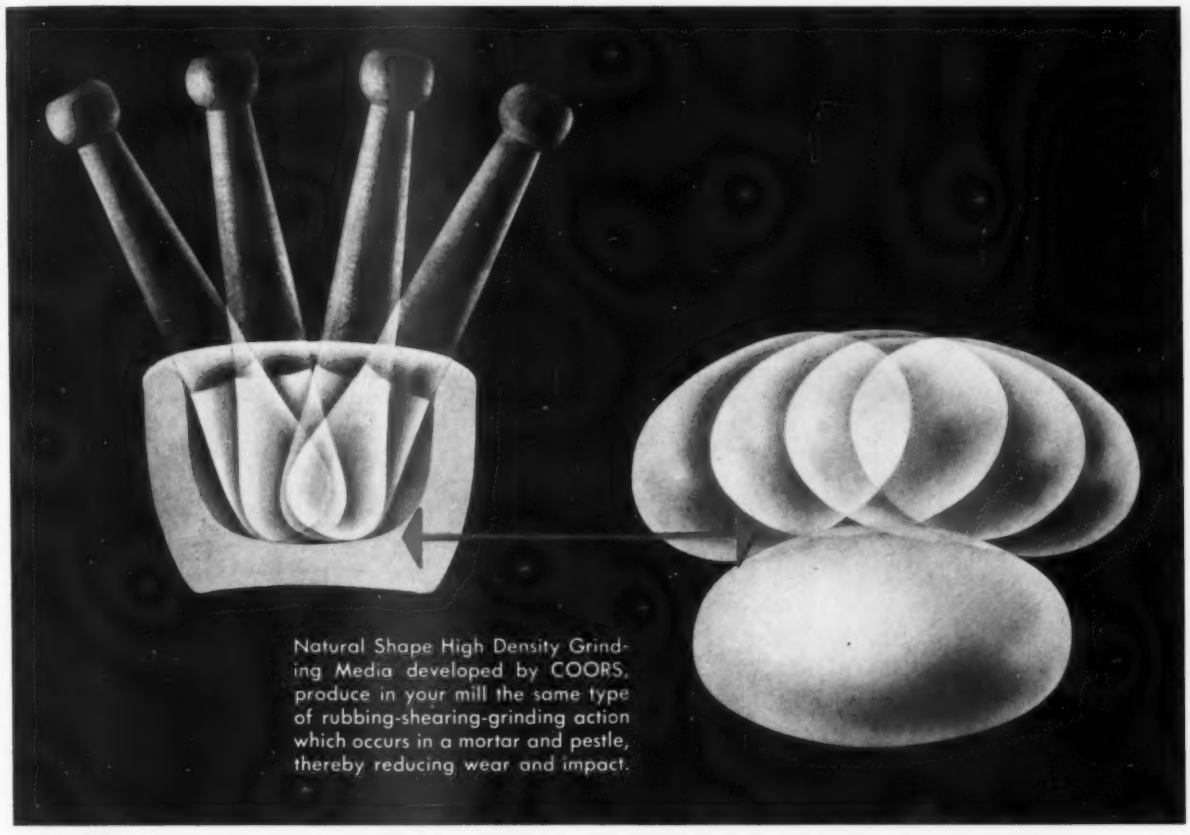
COLD ROLLED SHEETS AND STRIP

Youngstown

THE YOUNGSTOWN SHEET AND TUBE COMPANY Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES



Natural Shape High Density Grinding Media developed by COORS, produce in your mill the same type of rubbing-shearing-grinding action which occurs in a mortar and pestle, thereby reducing wear and impact.

Coors high density NATURAL SHAPE® grinding media gives mortar and pestle action!

Result: Minimum Wear with Maximum Grinding Efficiency

Shape of grinding media used in a mill apparently influences grinding results—therefore COORS developed the Natural Shape High Density Media.

In a mortar and pestle, grinding is done when the smoothly curved surfaces are forced together under pressure with a rubbing or shearing motion. COORS High Density Natural Shape Media, because of their shape and weight, do the job of grinding in a similar manner. In a mill charged with COORS Natural Shape Media you have, in effect, many thousands of mortars and pestles to do your grinding!

COORS Natural Shape Media (made of the same high density, high strength alumina ceramic as COORS Grinding Balls and Mill Lining Brick) are used in porcelain lined, rubber lined and stone lined pebble mills to increase mill production capacity. Also, they are used to replace steel balls in steel lined mills where iron contamination must be minimized.

Utilize the mortar and pestle action of COORS Natural Shape Grinding Media to increase the production capacity of your pebble mills. Write today for complete information, samples and the name of your local representative.

COORS PORCELAIN COMPANY
GOLDEN, COLORADO

Manufacturers of Coors High Density Grinding Media and Mill Linings.
National Sales Representatives...LZP Industrial Ceramics, 2500 West 7th Ave., Denver 4, Colorado.

Drawn aluminum electric frying pan with heating element brazed in place. Drawn parts with brazed heating elements can replace more costly and less efficient cast parts.

Deep drawn aluminum inner shells with heating elements brazed in place. Parts like these for fryers, popcorn poppers and other uses utilize Reynolds tremendous facilities for drawing, welding, brazing and finishing.

Drawn aluminum deep well cooker assembly with vessel, trivet and lid. Automatic buffing produces a lasting, beautiful finish that is also inexpensive. Reynolds offers complete facilities for buffing, etching, anodizing, color anodizing and other types of finishing operations.

REYNOLDS ALUMINUM

BLANKING • EMBOSSING • STAMPING • DRAWING • RIVETING • FORMING

for perfect parts made to order...get

ALUMINUM *Housewares Parts* from REYNOLDS

The housewares parts shown at left are typical examples of parts produced for the appliance industry by Reynolds Aluminum Fabricating Service.

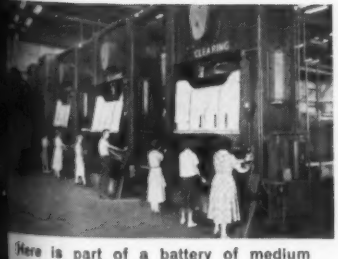
In parts like these the manufacturers profit by Reynolds tremendous facilities for furnishing press parts from simple blanks to deep drawn parts of large areas. They also benefit from Reynolds experience and from Reynolds vast brazing, welding and finishing facilities.

No matter what appliance part you require, chances are the great variety of Reynolds specialized fabrication equipment, Reynolds quality control from mine to finished product and Reynolds experienced design and engineering service can help reduce your costs and help make your products even better.

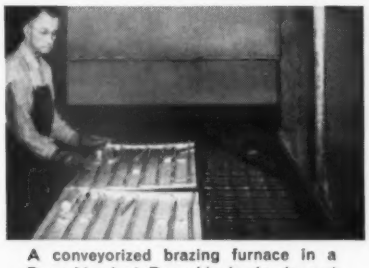
For full details on how Reynolds can help you, call the Reynolds office listed under "Aluminum" in your classified telephone directory or write *Reynolds Aluminum Fabricating Service, 2058 South Ninth Street, Louisville 1, Ky.*

FREE: Write for your free copy of the 20 page brochure "Aluminum Appliance Parts"

See "Mister Peepers", starring Wally Cox, Sundays on NBC-TV



Here is part of a battery of medium presses in a Reynolds plant. In two plants alone, Reynolds offers 128 presses including mechanical from 2 to 1700 tons and hydraulic from 500 to 5000 tons.



A conveyorized brazing furnace in a Reynolds plant. Reynolds day-in, day-out experience and most modern equipment and techniques assure you the very highest quality brazed and welded parts.

Small presses, too, are available in Reynolds plants to assure speedy delivery of high quality appliance parts produced to your own specifications by Reynolds Aluminum Fabricating Service.

FABRICATING SERVICE

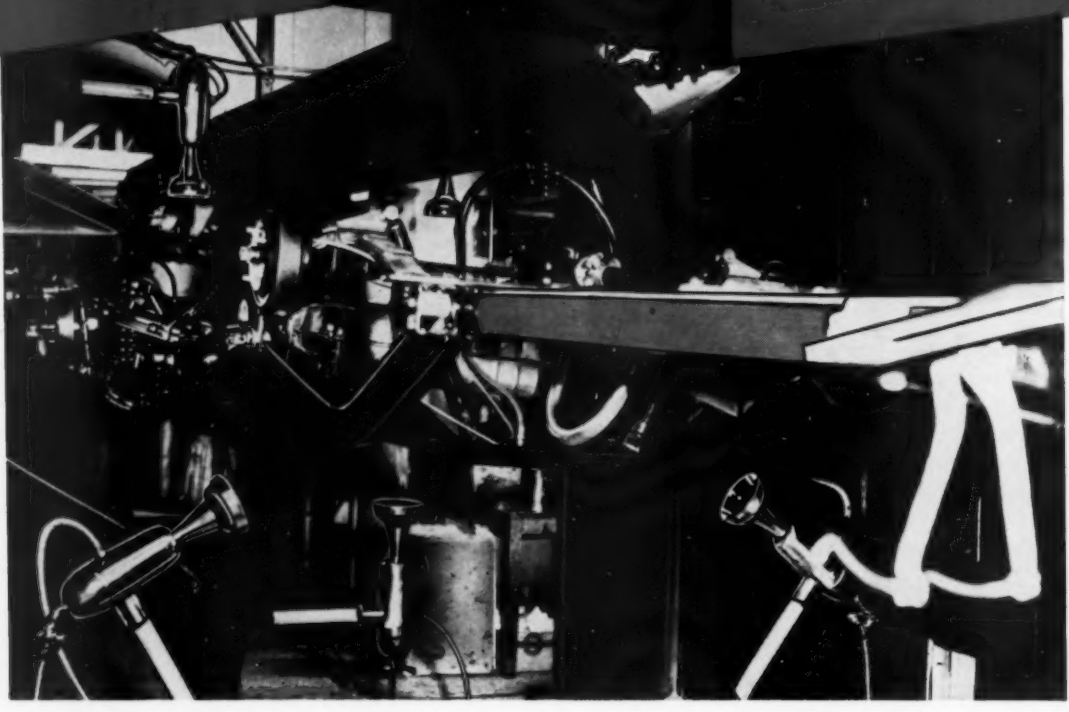
ROLL SHAPING • TUBE BENDING • WELDING • BRAZING • FINISHING

9 TIMES MORE PAINT MILEAGE ON AUTOMOBILE CHASSIS!

STUDEBAKER

gets a better, more uniform, paint job on chassis as production is increased and finishing costs are cut substantially with

RANSBURG NO. 2 PROCESS Electrostatic Spray Painting*



● When Studebaker Division, Studebaker-Packard Corporation switched to Ransburg No. 2 Process of Electrostatic Spray painting on their automobile chassis, paint mileage was increased 9 times.

By simply putting the paint where it's supposed to go, Studebaker cut daily paint consumption on the chassis production line from 14½ drums to 1½ drums. And, still they are painting 6 more chassis per hour with the No. 2 Process.

In addition to getting better, more uniform coverage with the asphalt-type coating, paint and labor costs were cut 70¢ per chassis. In eliminating the former set-up with 2 water wash booths and 12 automatic spray guns, they save nearly 1000 square feet of badly needed floor space.

Another on-the-job-example of the unmatched efficiency of the Ransburg No. 2 Process in which quality of the work is improved . . . AT LESS COST!

* *Studebaker also uses the Ransburg method to apply a heavier and more uniform primer surfacer on automobile bodies.*

Whatever your product—large or small—if your production justifies conveyorized painting, it's possible that one of the Ransburg electrostatic processes can do the job better, with substantial savings to you. We'll be glad to tell you about complete Ransburg services.

Ransburg ELECTRO-COATING CORP.

Indianapolis 7, Indiana

RANSBURG

For further information about Electrostatic Painting Processes, write Dept. F

Here's valuable information from Du Pont on

FINISHING ROOM AIR-CONDITIONING UNITS

Find out more about...

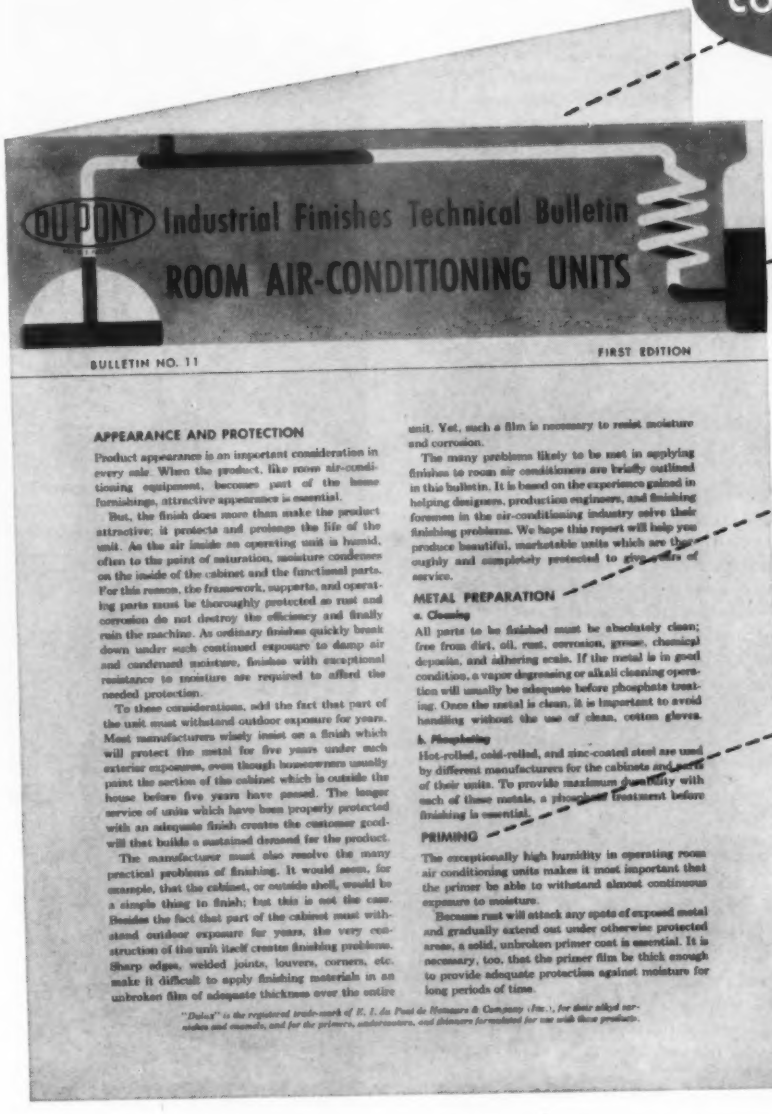
COVERAGE RATES

BAKING SCHEDULES

METAL PREPARATION

PRIMING

ENAMELING



DUPONT Industrial Finishes Technical Bulletin

ROOM AIR-CONDITIONING UNITS

BULLETIN NO. 11 — FIRST EDITION

APPEARANCE AND PROTECTION

Product appearance is an important consideration in every sale. When the product, like room air-conditioning equipment, becomes part of the home furnishings, attractive appearance is essential.

But, the finish does more than make the product attractive; it protects and prolongs the life of the unit. As the air inside an operating unit is humid, often to the point of saturation, moisture condenses on the inside of the cabinet and the functional parts. For this reason, the framework, supports, and operating parts must be thoroughly protected as rust and corrosion do not destroy the efficiency and finally ruin the machine. As ordinary finishes quickly break down under such continued exposure to damp air and condensed moisture, finishes with exceptional resistance to moisture are required to afford the needed protection.

To these considerations, add the fact that part of the unit must withstand outdoor exposure for years. Most manufacturers wisely insist on a finish which will protect the metal for five years under such exterior exposures, even though homeowners usually paint the section of the cabinet which is outside the house before five years have passed. The longer service of units which have been properly protected with an adequate finish creates the customer goodwill that builds a sustained demand for the product.

The manufacturer must also resolve the many practical problems of finishing. It would seem, for example, that the cabinet, or outside shell, would be a simple thing to finish; but this is not the case. Besides the fact that part of the cabinet must withstand outdoor exposure for years, the very construction of the unit itself creates finishing problems. Sharp edges, welded joints, louvers, corners, etc. make it difficult to apply finishing materials in an unbroken film of adequate thickness over the entire unit. Yet, such a film is necessary to resist moisture and corrosion.

The many problems likely to be met in applying finishes to room air conditioners are briefly outlined in this bulletin. It is based on the experience gained in helping designers, production engineers, and finishing foremen in the air-conditioning industry solve their finishing problems. We hope this report will help you produce beautiful, marketable units which are thoroughly and completely protected to give years of service.

METAL PREPARATION

a. Cleaning

All parts to be finished must be absolutely clean; free from dirt, oil, rust, corrosion, grease, chemical deposits, and adhering scale. If the metal is in good condition, a vapor degreasing or alkali cleaning operation will usually be adequate before phosphate treating. Once the metal is clean, it is important to avoid handling without the use of clean, cotton gloves.

b. Phosphating

Hot-rolled, cold-rolled, and zinc-coated steel are used by different manufacturers for the cabinets and parts of their units. To provide maximum durability with each of these metals, a phosphate treatment before finishing is essential.

PRIMING

The exceptionally high humidity in operating room air conditioning units makes it most important that the primer be able to withstand almost continuous exposure to moisture.

Because rust will attack any spots of exposed metal and gradually extend out under otherwise protected areas, a solid, unbroken primer coat is essential. It is necessary, too, that the primer film be thick enough to provide adequate protection against moisture for long periods of time.

"Dulux" is the registered trade-mark of E. I. du Pont de Nemours & Company (Inc.), for their alkyd varnishes and enamels, and for the primers, undercoaters, and thinners formulated for use with these products.

MAIL THIS COUPON TODAY FOR YOUR **FREE** COPY

E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Dept. F-54 Wilmington 98, Delaware.

Gentlemen:

Please send me, free of charge, your new bulletin on finishing room air-conditioning units.

*Name*_____ *Title*_____

*Firm*_____

*Street*_____

*City*_____ *State*_____

DUPONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

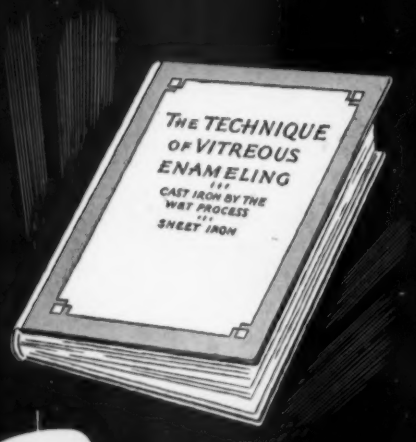
INDUSTRIAL FINISHES

Paints, Varnishes, Lacquers, Enamels and Specialized Adhesives

Chemically engineered to do the job better

1920 FERRO 1955

A business grown big through SERVICE



1926

Ferro publishes first Practical Handbook for Porcelain enamel technicians.

1955

Ferro Operating Manuals are standard reference books in teaching the modern science of Porcelain enameling.

FERRO CORPORATION

cleveland · nashville · los angeles

IN CANADA: FERRO ENAMELS, LTD., OAKVILLE, ONT.

matters of mutual interest

Gentlemen:

It was a pleasure to read your report of the Home Laundry Conference, and I certainly appreciate the prominence given it. I always enjoy looking through the magazine of Appliance and Metal Products Manufacturing and, from where I sit, it does the best reporting job for the industry on matters of mutual interest to all the manufacturers serving the appliance market.

Howell G. Evans
Senior Vice President
Hamilton Manufacturing Co.
Two Rivers, Wisconsin

---

the Packard story

Gentlemen:

I have just had a chance to look over the special Packard section of *finish*. As usual, you have done a very impressive job. I personally am pleased with it as the first complete report on what we have been trying to do here. Best wishes on your continued success.

James J. Nance
President
Studebaker-Packard Corporation
Detroit, Michigan

---

uncovering a market

Gentlemen:

We have received a number of inquiries from companies interested in using our material and appreciate your featuring it in such a manner. We had no idea that there was a potential market for such a product, and it has come as a most agreeable surprise.

Hugh V. Penton
Vice President — Manufacturing
California Metal Enameling Co.
Los Angeles, California

Mr. Penton refers to the article, "Ceramic Coated Shim Stock", which appeared in the February 1955 issue.—Eds.

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infra-red drying

Gentlemen:

We are very much obliged for the receipt of the six copies of the article which appeared in December 1954

to Page 108 →

1920 FERRO 1955

A business grown big through SERVICE

1927

Ferro holds first Industry Trade School, training customers' personnel in new P. E. techniques.

1955

The Porcelain Enamel Institute, direct outgrowth of these early trade schools, celebrates 25th anniversary.

FERRO CORPORATION

cleveland · nashville · los angeles

IN CANADA: FERRO ENAMELS, LTD., OAKVILLE, ONT.

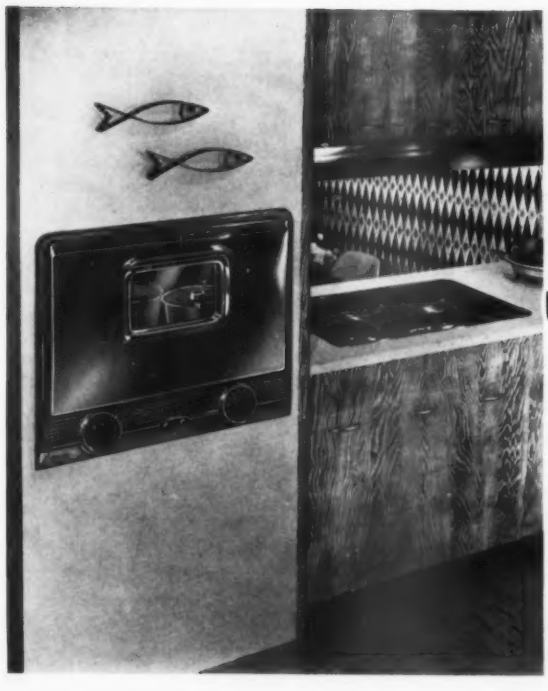
it's as easy as this...

FOR WESTINGHOUSE

PERMA-VIEW

the window you can see through always!

"out of our carton— into your door"



Yes sir, it's as easy as this. The PERMA-VIEW oven door window comes to you ready for immediate installation in your range — to add a sales feature second to none.

The strong steel encased, double pane PERMA-VIEW window incorporates the finest quality heat resisting glass. It is mechanically sealed to prevent infiltration of vapors and to eliminate "fogging." This "non-fog" window meets the constantly growing demand for "visible baking."

More and more range manufacturers are turning to PERMA-VIEW as a practical, economical and effective sales feature for their new models. We will gladly work with your engineering department in adapting its use to your range. Write or phone for complete information.

Phone MArket 4-2256

The new WESTINGHOUSE built-in oven is 24 inches wide and is equipped with a PERMA-VIEW window. The PERMA-VIEW window plus a light inside the oven make it possible for the user to see inside without opening the door.

MILLS PRODUCTS, INCORPORATED

1015 W. MAPLE ROAD • WALLED LAKE, MICHIGAN

WASHING MACHINE TUB
Seamless Drawn
Vitreous Enameled
Height.....14¼"
Diameter.....22"
BASE FOR SWIVEL CHAIR
Seamless Drawn Carbon Steel
Length 25" Height 4"
MIXING BOWL
Seamless Drawn Carbon Steel
Welded Brackets
Diameter.....14"
Height.....10½"
it's our business
to make stampings like these
for your business
G. P. & F.
meets your needs for large and medium size seamless stampings PLUS complete finishing and assembly facilities
Shown here are just a few of the hundreds of different kinds of seamless drawn stampings we have manufactured for America's foremost companies. We made them economically, we made them right, we made them on time.
Our services do not end with stamping. We have complete facilities for finishing and assemblying, galvanizing, spray finishing, vitreous enameling, welding. If desired, we even package your products and ship to your customers!
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Width.....10¼"
Height.....6¼"
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Seamless Drawn Aluminum
Baked Enamel Finish
Height of Tub....11"
Length and Width 17"
AMMUNITION BOX
(U. S. Ordnance)
Carbon Steel—Spray Painted
Length.....10"
Height.....7"
Width.....3⅝"
COVER, FUNNEL AND TANK FOR SOAP DISPENSER UNIT
Seamless Drawn Brass
Height of Tank....7"
Dia. of Tank....4⅛"
DEEP FAT FRYER POT
Seamless Drawn Stainless Steel
Height.....12"
Length and Width..17⅛"
COVER FOR OIL BURNER UNIT
Seamless Drawn Carbon Steel
Height 5½" Length 12⅛"
Width.....7½"
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PHOTO COURTESY MASTERCRAFT METALS

Forming stainless steel in a press brake. The metal is protected by paper strip on the upper and lower dies.

Drawing and forming chromium-nickel stainless steels

basic information for every fabricator who works with stainless steel

by W. E. McFee • *SUPERVISOR, PRODUCTION INFORMATION SERVICE, ARMCO STEEL CORPORATION*

Exclusive feature finish

Chromium-nickel stainless steels are extensively used for deep-drawn parts of appliances and other metal products because they are ductile and offer other advantages, both in fabrication and in use.

However, they have certain inherent characteristics influencing drawing practice that must be kept in mind.

One is great strength which calls for heavier presses and increased power to provide the additional punch and hold-down pressures needed to make a satisfactory draw.

Another consideration is the fast work-hardening rate. With deep draws, slower press speeds than customary for carbon steel are mandatory for uniform work-hardening.

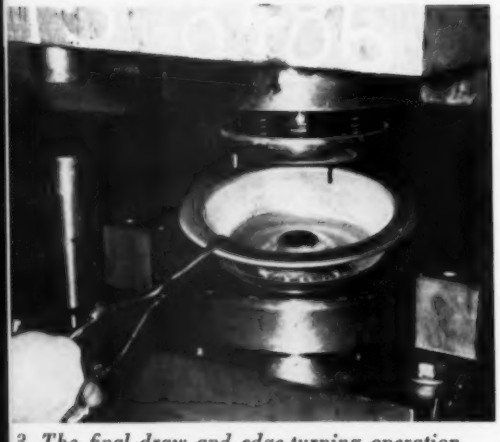
Still another is the fact that greater friction created by pressures beyond those required for the carbon steels dictate adherent lubricants with high film strength.

A quick review of the stainless types and finishes customarily used for deep drawing work shows that sheets in No. 2D finish and strip in No. 1 finish lead all the rest. These are pickled finishes and hold lubricants considerably better than a smooth, bright cold rolled surface.

Types 302 and 304, deep drawing quality, are amply ductile; yet work-harden rapidly. In very difficult

1. Drawing stainless steel adapter rings for kitchen ranges in the plant of a leading appliance manufacturer.

2. Edge of adapter ring is trimmed and the center hole is punched in this operation.



3. The final draw and edge-turning operation on stainless steel adapter rings.

4. Rough grind on adapter rings following the final draw and edge-turning operation.

draws they may have to be annealed between draws or stress-relieved after the final draw to prevent stress cracking. This is not usual, but in cases where it is necessary with Types 302 and 304, it is sometimes possible to do away with process annealing and stress relieving after drawing operations by the use of Type 305. This stainless steel has a lower work-hardening rate than Types 302 and 304, for example, owing to increased nickel content.

Correct die practice

First, is the matter of die metal. For short production runs, close-grained, hard cast iron will do the work well, and of course is an economical material. For somewhat longer runs, cast irons with small quantities of chromium and nickel have proved most satisfactory. Stepping up to high production work, however, demands the use of solid alloy tool steel because these harden deepest and assure greatest wearing qualities.

Experience in die design bears out that in general the wall thickness of dies must range up to 50 per cent heavier for stainless steels than for low-carbon steels.

Clearance between punch and die is at least twice that usually allowed for an equal thickness of low-carbon steel.

Die radii should be as generous as the job permits for easy flow of the stainless steel into the dies. A reasonably safe recommendation here is a minimum radius of five times the metal thickness for die-and-punch-nose radius.

Draw rings of hard bronze or aluminum bronze alloy are widely used for drawing stainless steels. They resist seizing and consequently the ring surface is more likely to stay smooth and clean.

Hold-down pressure is an important part of the operation. For small production parts requiring only a shallow draw, spring-loaded pads are useful as hold-downs. For larger parts and deeper draws, where much closer adjustment of hold-down pressure is required, a double-action mechanical, toggle or hydraulic press gives much better results. In all cases, hold-down pressure must be uniformly distributed, with pressure being just enough to permit smooth flow over the draw ring without wrinkling.

Proper die maintenance requires that working dies be in a polished condition. Rough dies leave objectionable impressions on the stainless steel surfaces that mean costly and time-consuming grinding operations later on, especially when the end-product or part is to be polished. Always use a fine stone for finishing and smoothing dies.

An aid to consistently good drawing performance is to keep all working stocks of stainless steels at least at room temperature. Never draw in a cold condition, even if it means warming up the stock after withdrawing from a cold warehouse.

Check your drawing lubricants

Drawing lubricants will not be dealt with in detail here because there are so many drawing situations and some of these require individual treatment. Generally speaking,

Annealing Temperatures for Chromium-Nickel Types

Grade	Type	Annealing Temp. Range
17-7	301	1900-2050 F
18-8	302	1900-2050 F
18-8 Si	302 B	1900-2050 F
18-8 (Low Carbon)	304	1850-2050 F
18-8 ELC (Extra-Low-Carbon)	304 ELC	1850-2050 F
18-11 FS	305	1850-2050 F
20-10	308	1850-2050 F
25-12	309	1900-2050 F
25-20	310	1900-1950 F
18-12 Mo	316	1900-2050 F
18-12 Mo ELC	316 ELC	1900-2025 F
19-12 Mo	317	1950-2050 F
18-10 Ti	321	1750-1950 F
18-10 Cb	347	1800-1950 F

though, successful drawing of stainless steels demands heavy pressures which generate high temperatures. This means that the lubricant must be heavy-bodied with sufficient film strength to maintain an unbroken film on the metal.

(Established producers of drawing compounds for use on stainless steel are always ready to offer advice on the best lubricant to use for a given situation or requirement.)

To apply lubricant, pass the blank through oiled rolls or hand-brush the blank. The latter method has the advantage of enabling an experienced press operator to use the right quantity in the most desirable places.

If annealing between or after draws is necessary, be sure to clean the part thoroughly before annealing to prevent surface carburization with its attendant hazards of corroding and pitting.

Relatively little time at annealing temperature is needed. Light gage stainless can be soaked for only a minute or two. Three minutes for every 1/10 inch of thickness is a reliable rule to follow. Extended heating in the upper temperature ranges will induce "orange peel" when the part is later drawn or formed; also scale which is not easily removed. *(See Table)*

Cool the chromium-nickel types rapidly from annealing temperatures. Air-cooling is recommended for metal up to 0.250 in. thick containing a maximum of 0.08 per cent carbon; and up to 0.078 in. thick containing a maximum of 0.10 per cent carbon.

Forming techniques

Procedures in forming chromium nickel stainless steels on apron or press brakes are the same as with low-carbon steels. However, much more power is needed. When formed in the fully annealed condition, greater allowance also must be made for "springback." This factor increases in the ¼ hard temper grades, and steps up even more for ½, ¾ and full hard temper. When springback in the higher tempers makes forming of large radii in brakes too difficult, stretch forming must often be used.

The added cost for special tooling

Roll-forming stainless steel in the simplest type of roll former. A three-roll machine can bend up to about 14 gauge metal in several passes.

Forming stainless steel in a box and pan brake. Note protective paper—always a "must" when work is being done on polished surfaces.

Forming operation on a 20 gauge stainless steel strip in a lock-type former.

set-ups can be avoided by the use of a few inexpensive standard dies that produce a wide variety of shapes. Here again, dies should be highly polished and free of the slightest mark that could be transferred to the sheet or strip.

Where lubricants are required, the same compounds used for deep drawing are recommended.

Polished sheets should be protected when forming in a brake. Applying adhesive tape to the dies is one good way. Or, paste newsprint on the surface with paper hanger's paste. Special protective papers are also available for this purpose and usually can be stripped and reused.

Fully annealed 18-8 material can be bent to a sharp 180 degrees flat on itself with or against the grain. There is no cracking hazard up to 3/16 or 1/4 inches thick.

Roll forming is chiefly used for forming stainless strip into channels, moldings and similar parts. With certain changes, equipment used for low-carbon steel will do the work. These usually involve roll design, guides and lubricant and are required because stainless steel is harder and stronger and works differently.

Where case-hardened steel rolls are not satisfactory — and this would be the exception — they can be faced with a bronze overlay to reduce "pick-up". Machine the rolls undersize to allow for application of the ⅛" minimum thickness of bronze.

Rolls should be highly polished to permit slippage and to prevent dragging. Polish rolls with oiled emery cloth. Roller type guides reduce friction and tendency of the metal to work-harden.

A somewhat thinner lubricant is used than in drawing operations. It is applied to the strip by passing between wipers before entering the first set of rolls. Another method is to pipe the lubricant to the rolls and let it flow over them.

Hot forming is usually confined to work on heavy stainless steel sheets and plates, and will not be dealt with in this article.

Corner notching operation on stainless steel ice cream cabinet top.

The "how-to-do-it" of drawing and forming the chromium stainless steels also was not included, because of the much wider use of the chromium-nickel grades in appliances and related metal products.

A small job but a very important one. It's a press forming operation on stainless steel closure rings for snap-action bi-metallic thermostats.

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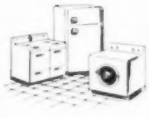

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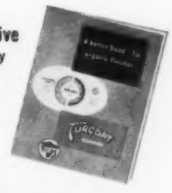

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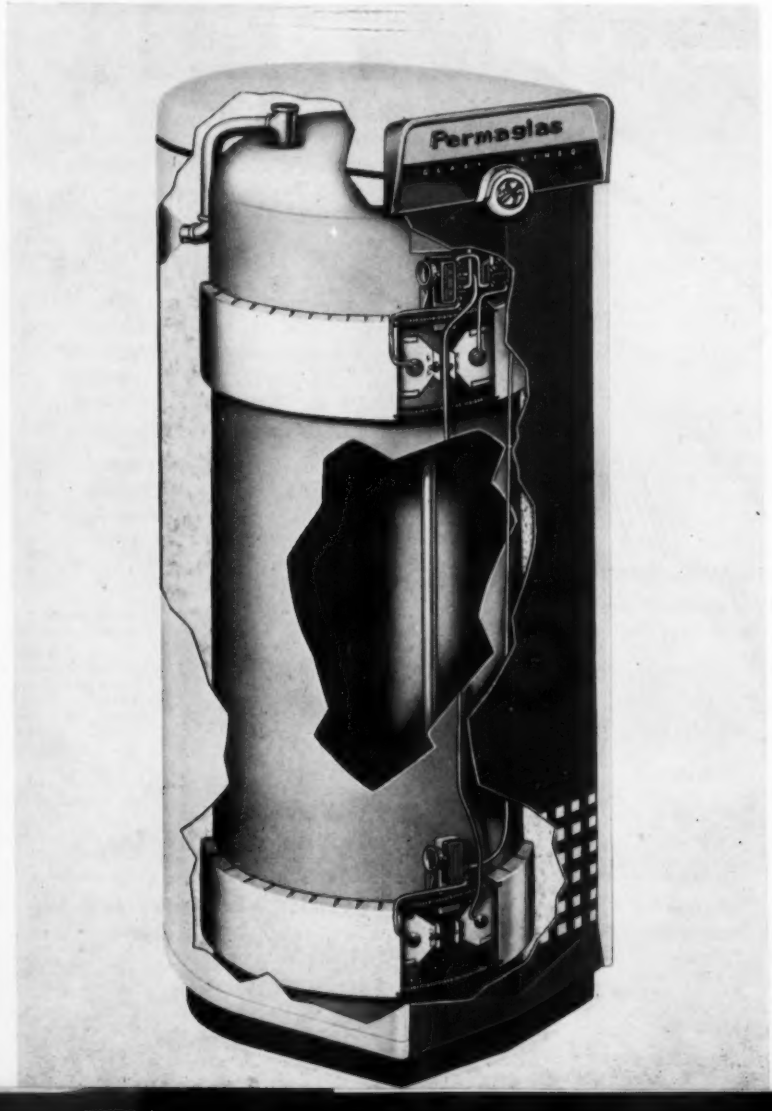
A "new look" for Permaglas water heaters

including a report on engineering and design advancements of gas and electric models

A new look in water heaters was unveiled recently when A. O. Smith Corporation introduced its newly-designed Permaglas water heaters at a national sales meeting in Kankakee, Illinois.

Permaglas officials responsible for the design and development of the radically new silhouette in water heaters, achieved at a reported cost of nearly $750,000, predict that their deluxe units will strongly advance the trend which is bringing the water heater from its old role in the basement to a new place in the kitchen-utility room areas.

Cutaway sketch of electric water heater with details of wrap-around elements.



The new "square" look

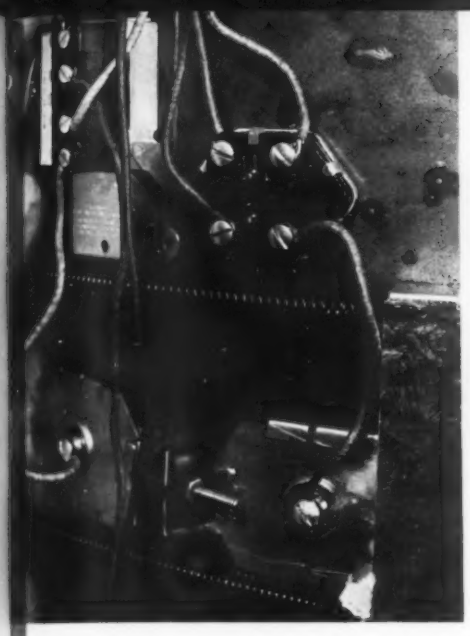
Although it still houses a round inner tank, the exterior of both the gas and electric deluxe models have been given a new "square" look with a flat front, and sides that taper slightly outward to meet the more conventionally curved posterior. The angular contours enable the units to fit harmoniously alongside or between standard rectangular appliances in the kitchen or utility areas *(see "The Finish Spotlight", March 1955 issue)*.

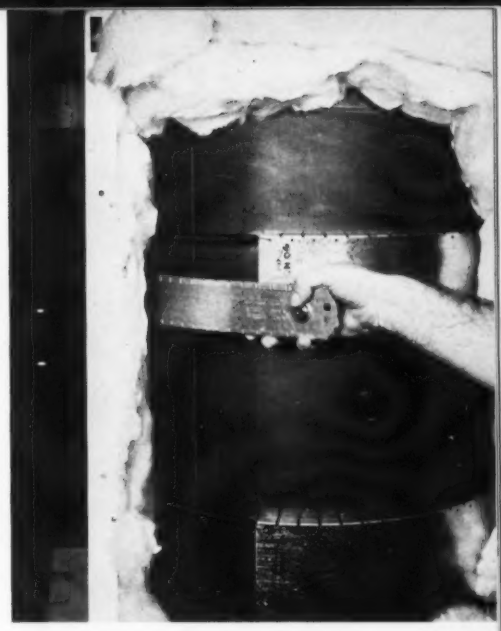
Color introduced

Color has been introduced and is employed most noticeably on the front panel of deluxe models where an aqua hue makes it compatible with kitchen or utility decor. The front panel is easily removable to provide access to interior controls. Here a cowled or hooded design incorporates the Permaglas signature. This device is worked in copper decor against the porcelain white. The hood is a die cast section. To relieve the long aqua expanse, a checkerboard pattern in white is used on the lower extremity of the panel. Slight contours, both vertical and horizontal, take away any semblance of flatness from the panel.

Eye-level temperature control

A new "Eye-Hi" temperature control knob permits adjustment of con-





Photos on this page show some of the details of the new fully-flexed wrap-around heating element which is used on all 1955 Permaglas electric water heater models. Note the clamps, tension springs, the 5 x ¾-inch channel in which the wrap-around slides, and the notched edge of this aluminum-clad steel element which permits it to go from a fully-extended to fully-flexed position. This new element can be replaced in a few minutes with pliers or screw-driver.

trols without stooping, and places the control knob out of reach of small children. Behind the removable front panel a cable mechanism connects the eye-level control knob with the working controls located at the base of the unit.

Space saving design

A new closed-end tank structure permits a more compact, space-saving design, lowers the over-all height of the water heater, and thus extends the opportunities to install it in locations where space is limited.

A 10 per cent increase in hot water delivery by the deluxe 30-gallon gas water heater has been accomplished by boosting its heat input rating to 33,000 Btu/hr.

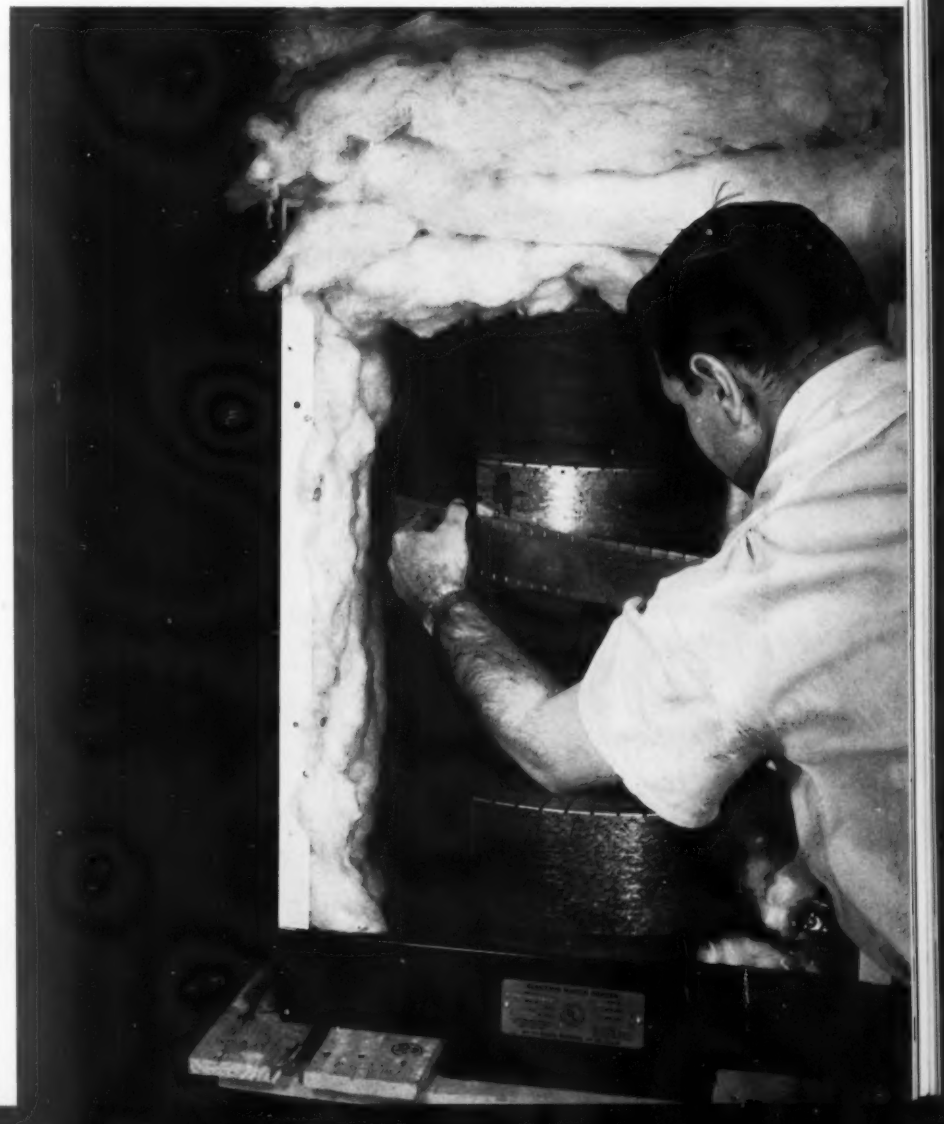
Wrap-around heating element

A major improvement in Permaglas electric water heaters is a new wrap-around heating element made of aluminum-clad steel with notched flanges which lend it full flexibility, according to A. O. Smith engineers. The wrap-around element can be slipped easily, without twisting, into the 5 x ¾-inch channel which was designed to receive various sizes heating elements, thus allowing various sizing requirements.

Two springs, with clamp fixtures, keep the wrap-around under the proper tension when in position. The tank need not be drained before replacement of the wrap-around, and the replacement operation can be effected in a matter of minutes.

A. O. Smith engineers also report that improved insulation characteristics has enabled them to decrease the insulation blanket from 3″ to 2½″, thus narrowing the diameter of some electric models by one inch.

Two thermostats are used to control water temperature. And even if both thermostats were to fail, a built-in high limit control cuts off the electricity if the water should get too hot.



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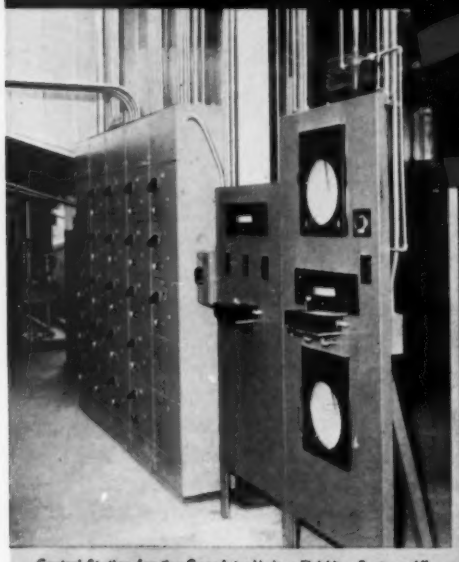

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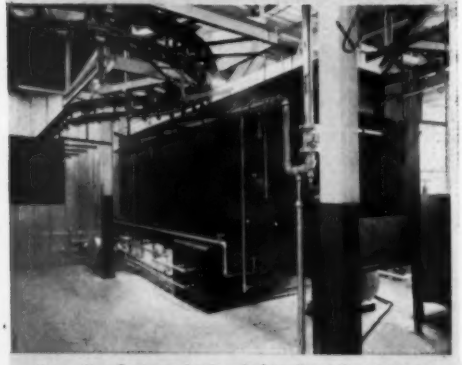
View inside the enclosure which houses the Complete Mahon Finishing System installed in the General Purpose Control Department of the General Electric Plant, Bloomington, Illinois.

Mahon Open-Face Hydro-Filter Spray Booth designed to meet specific painting requirements of certain products in the General Purpose Control Department of the General Electric Company.



Mahon Flow-Coater and exit end of ventilated Flash-Off Area and Drip Zone. Part of the conveyorized system at General Electric.

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This type of tray is being tried through the flow coating machine for some odd-shaped small parts not readily hangable from clamps or hooks.

Flow coating zinchr

by James Joseph

NORTHROP Aircraft, Inc. has succeeded in adapting flow-coating to extremely low viscosity finishes; specifically, Northrop primes aluminum stampings and extrusions.

Company engineers say that zinc chromating small parts by the flow-coat method has: (1) doubled output; (2) cut both labor and finish costs; and (3) sharply reduced handling, especially where small, many-surfaced parts are involved.

As many as 600 parts an hour are processed through a single flow-coating booth.

The process begins in the finishing department when aluminum extrusions and stampings are delivered from production. These parts, destined for aircraft interiors, get but a single coat — the primer. Zinc chromate, thinned with flow-coat prime reducer, acts principally as a corrosion inhibitor . . . especially for aluminum and the aluminum alloys.

Specifications require that the thickness of a single dried primer coat be held between 0.25 and 0.35 mil (0.00025-0.00035-inch). Prime thickness on surfaces to be topcoated must not exceed 0.7 mil (0.0007-inch). Otherwise there's danger of embrittlement and cracking in the overlying coat. Also avoided: any dried film thickness less than .25 mil —this because very thin films are less effective as corrosion-inhibitors.

There are a number of application criticals. Among them: (1) nozzle pressure, (2) ratio of thinner to primer, (3) nozzle volume.

These factors, in turn, determine (1) thickness of the wet coating, thus dry finish thickness; (2) amount of thinner lost up the booth's stack; (3) amount of primer and thinner added during any finish run.

"Pressure is exceedingly critical," says K. B. Niles, Northrop process engineer. "Raise the pressure 1 to 2 psi," he continues, "and you lose two-three times as much solvent (thinner) up the stack."

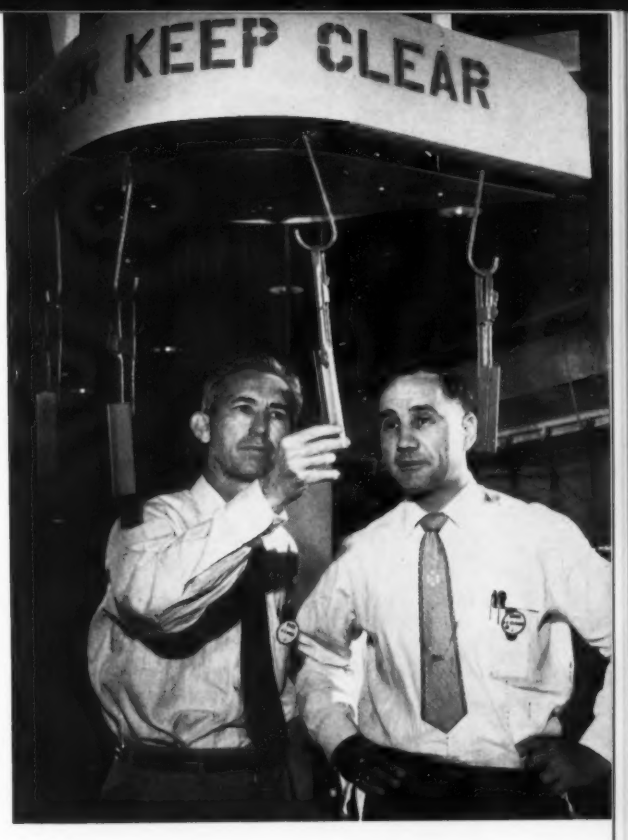
Material carefully controlled

To obtain proper finish thickness, Northrop reduces its zinc chromate primer — and maintains it — at 2½ parts of flow-coat reducer to 1 part packaged primer. This primer-to-thinner ratio is rigidly followed. An operator checks the spray booth's reservoir (operating tank) every fifteen

Flow coating line's loading area. Before hanging on conveyor, all parts are stamped with their Air Force spec. number which will remain visible through the dried primer finish.

zinchromate primer

Northrop Aircraft speeds production, cuts costs by combining flow coating and infra-red drying



J. D. Breneman (right), head of Northrop paint & process dept., and E. E. Honena, asst. foreman, inspect parts just off the flow coating line. Hooks and clamps shown here make conveyor adaptable to heavy or light loads.

minutes, gauges viscosity by a weight per gallon chart.

Aluminum parts delivered to finishing have already been anodized. Before they're loaded onto the flow-coating conveyor, parts are stamped with their Air Force spec. This number remains visible through the dried primer finish.

After stamping, parts are loaded onto a 320-ft. overhead conveyor. The conveyor (standing 7'1" above the finish room floor and rigged every 12 inches with clamps or "christmas tree" fixtures) moves at a rate variable between 3 and 12 ft. per minute. The trolley has a 40-lbs./per ft. load capacity.

Parts as large as 5' x 6' are run through the flow-coater in addition to the many smaller parts.

Finishing involves four stations: (1) loading; (2) the flow-coater booth; (3) infra-red drying; and (4) the unloading-packaging station.

Parts travel through the flow-coater, are carried 100 ft. to the dryer, travel another 35-50 ft., and are unloaded.

Results — in materials and labor

What has zinc chromating by flow coating meant for Northrop?

(1) Now twice as many parts are primed per hour compared to dip and hand application methods.

(2) Because flow coating is completely automatic, less labor is involved. One girl can handle conveyor loading, another the unloading. These, a spec. number stamper and a booth operator (who keeps reservoirs filled and the viscosity to spec.) handle the entire finishing line.

(3) Compared to dipping, flow coating uses less primer although evaporation of high-boiling point thinners is somewhat higher.

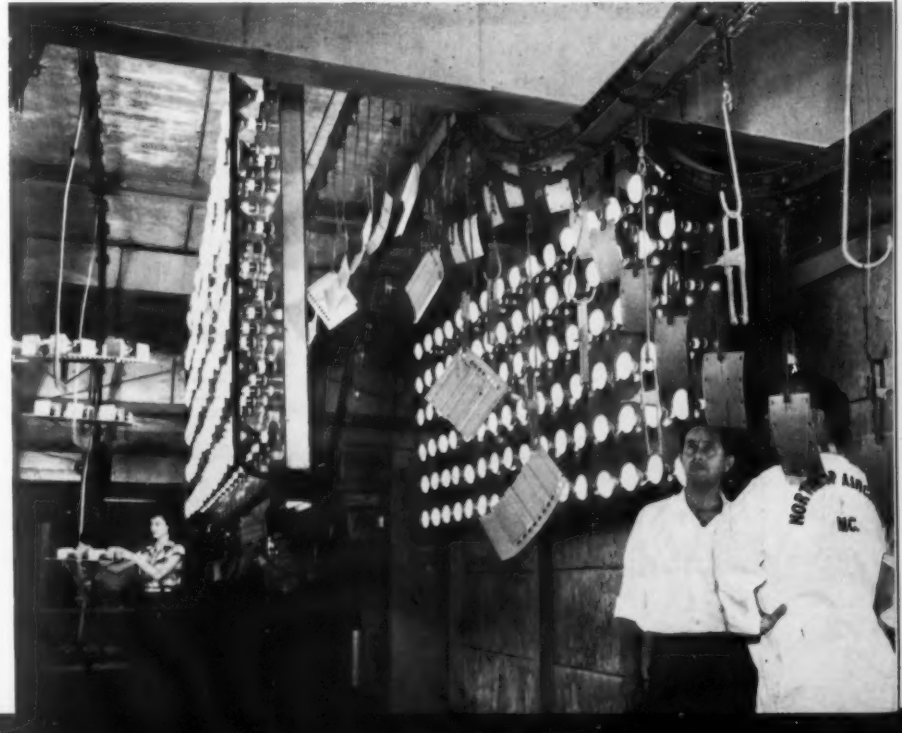
(4) Flow coating accomplishes in a single pass what manual spraying or dipping sometimes failed to do in two passes.

(5) Since only about 45 gallons of thinned chromate circulates the flow coat booth, waste through contamination is reduced. Whereas dip-tank contamination often meant loss of 1500 gallons of primer, the flow coater limits loss to the circulating gallonage.

(6) Eliminated is extensive handling of small, many surfaced extrusions and stampings.

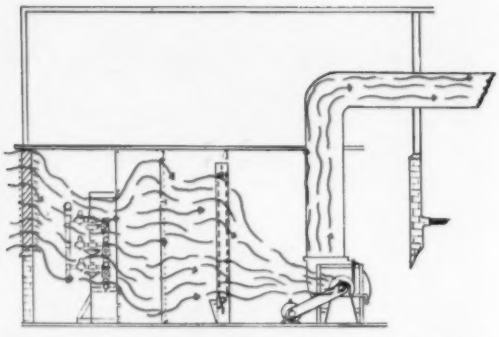
(7) So all-coverage is the method

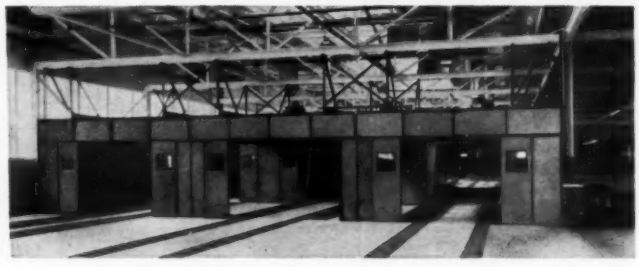
to Page 64 →

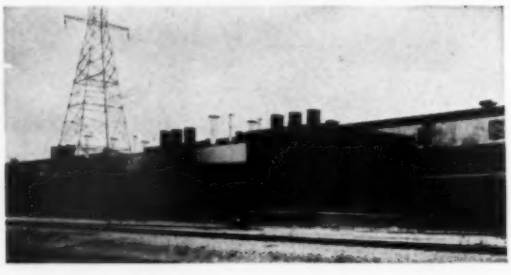


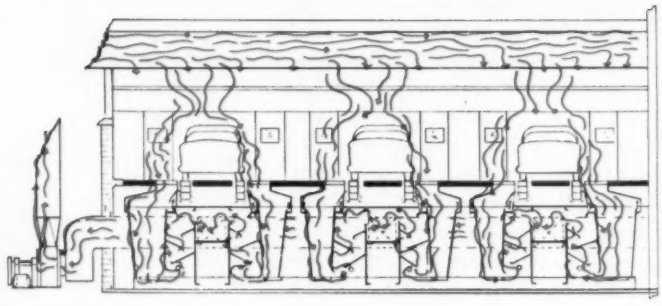
In the Northrop infra-red drying set-up, each bank of heat lamps is focused against a sheet of polished aluminum so that the heat rays are reflected back to dry the "off side" of the ware.

Another Problem...*FINISHED*









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Sonic method for measuring Young's modulus of elasticity of porcelain enamel-metal composites

by Robert E. Cowan

AMONG the physical properties of porcelain enamels, those of an elastic nature have received the least amount of study. Inasmuch as elasticity is a fundamental characteristic of all engineering materials, it is unfortunate that such is the case. Of paramount importance in the use of porcelain enamels are fatigue strength, impact resistance, and deformation resistance, all of which are related to modulus of elasticity. A considerable amount of the investigation conducted on this subject has been without regard to chance variation among the values. Hence much confusion is found in the literature with regard to composition factors for calculating the elastic modulus. It was the purpose of this investigation to develop a method whereby Young's modulus of elasticity could be easily and accurately measured and to evaluate the effect of certain mechanical and chemical treatments on the modulus of elasticity of the composite.

Literature survey

Harrison, Shelton, and Wadleigh[1] made measurements of Young's modulus by deflection of drawn enamel rods as simple beams. A similar method was used by Parmalee and Shaw.[2] They, however, used enamel glass bars loaded as cantilever beams and computed the modulus from the deflection. Wolford and Selby[3] did extensive research on Young's modulus, using the beam deflection method with third-point loading. In conjunction with their experimental work, Wolford and Selby approached the problem from a theoretical standpoint. An equation was derived in which Young's modulus of the composite was a function of the modulus of the metal, the modulus of the enamel, and of a thickness parameter. The expression is given in equation (1).

$$\overline{E} = (E_1 - E_2)Q^3 + E_2 \qquad (1)$$

$\overline{E}$ = Young's modulus of the composite

E_1 = Young's modulus of the metal

E_2 = Young's modulus of the enamel

$$Q = \frac{\text{thickness of metal}}{\text{thickness of composite}}$$

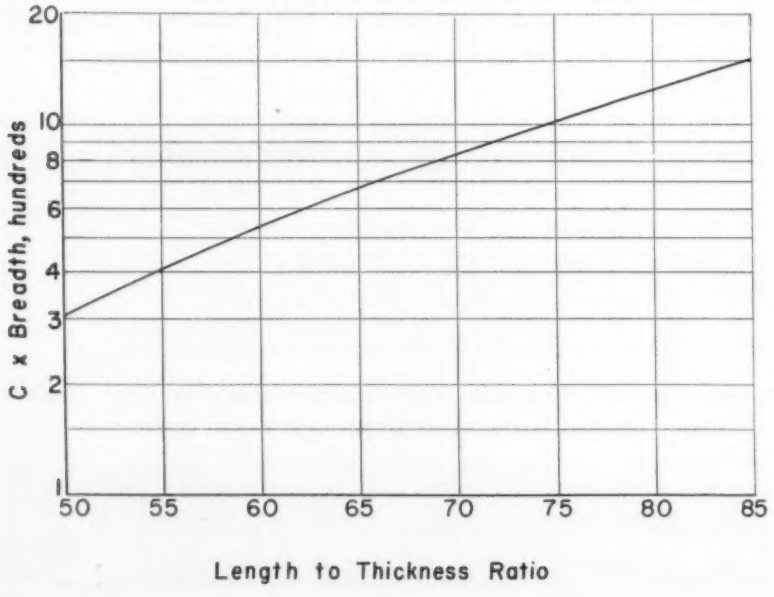
Therefore, it is seen that a plot of $\overline{E}$ versus Q^3 should yield a straight line relationship.

Test method

(1) Theory

The sonic method of measurement was used throughout the investigation. The method is based on the fact that any prismatic shape will vibrate in a manner which depends on its dimensions and its elastic properties. Thus dimensional and vibrational measurements allow the calculation of elastic properties. As the name implies, the sonic method is restricted to transverse vibrations within the audible range (20-20,000 cycles per second). It must not be confused with ultrasonic techniques, in which longi-

Figure 1 — Graph for determining the constant C_1 from sample dimensions.



1. Harrison, Shelton, and Wadleigh, "Strength and Young's Modulus of Some Ground-Coat Enamels for Sheet Iron," *Jour. Am. Cer. Soc. 18*, 3, 100 (1935)
2. Parmalee and Shaw, "The Effect of Additions of CaO and MgO on Enamel Glasses," *Jour. Am. Cer. Soc. 13*, 7, 498 (1930)
3. Wolford and Selby, "Stiffening Effect of Porcelain Enamel on Sheet Iron: I-II," *Jour. Am. Cer. Soc. 29*, 6, 162 (1946)
4. Pickett, "Equations for Computing Elastic Constants from Flexural and Torsional Resonant Frequencies of Vibration of Prisms and Cylinders," *Proceedings of ASTM 45*, 846 (1945)
5. ibid.
6. Wolford and Selby, op. cit.
7. Pickett, op. cit.

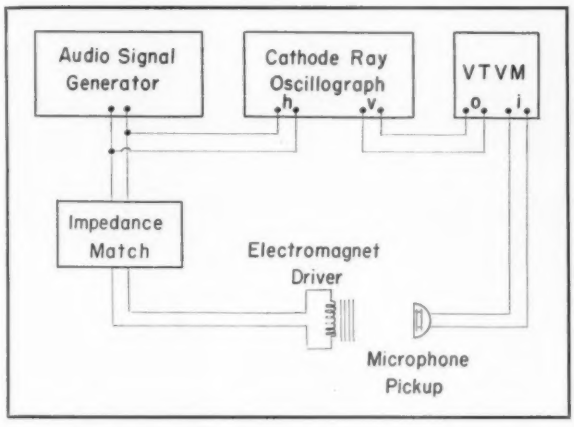


Figure 2 — Diagram of the sonic equipment.

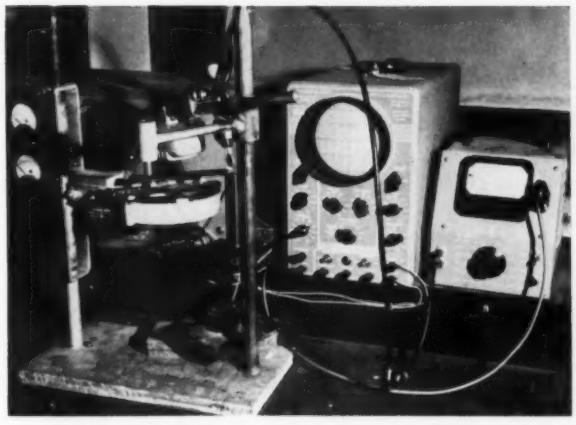


Figure 3 — Photograph of sonic equipment.

tudinal vibrations of much higher frequencies are employed.

When a specimen is subjected to transverse vibrations and when the excitation frequency is equal to one of the fundamental modes of vibration, resonance will occur between the driving source and specimen. At this point, Young's modulus of elasticity and the resonant frequency are related by the equation[4]

$$E = C_1 W n_1^2 \qquad (2)$$

where W is the weight of the specimen in pounds, n_1 the frequency of the first mode of flexural vibration, and C_1 a constant which is dependent upon the shape and dimensions of the specimen and upon Poisson's ratio of the material. Pickett[5] has given a series of equations and curves whereby the effects of shear and of rotary inertia are taken into account. Poisson's ratio for steel is generally accepted to have the value of 0.25. This value for enamels has apparently not been measured, but glass is listed as having values ranging between 0.197 and 0.319[6]. When working with specimens having thicknesses which are small in comparison with length, Poisson's ratio does not affect the constant C_1 and Young's modulus. This is shown by Pickett[7] in a plot of Goens' correction factor versus the thickness to length ratio. The ratios encountered in this experiment yield a correction factor value which is essentially unity. The constant C_1 is obtained from a graph on which is plotted C_1 times breadth versus the length to thickness ratio as shown in *Figure 1.* The length to thickness ratio is calculated and the corresponding value of C_1 times breadth is obtained on the graph. Division of this value by the breadth therefore yields the constant C_1.

(2) Equipment

The sonic equipment is shown diagrammatically and pictorially in *Figures 2 and 3* respectively. The variable frequency to the driver is supplied by an audio signal generator. A miniature earphone with the diaphragm removed constitutes the driver. As the magnetic field varies with the frequency of the alternating current, the ferromagnetic specimen is caused to vibrate with an identical frequency. The vibrating sample,

Figure 4 — Position of nodes and shape of oscillograph figures for first mode of flexural vibration.

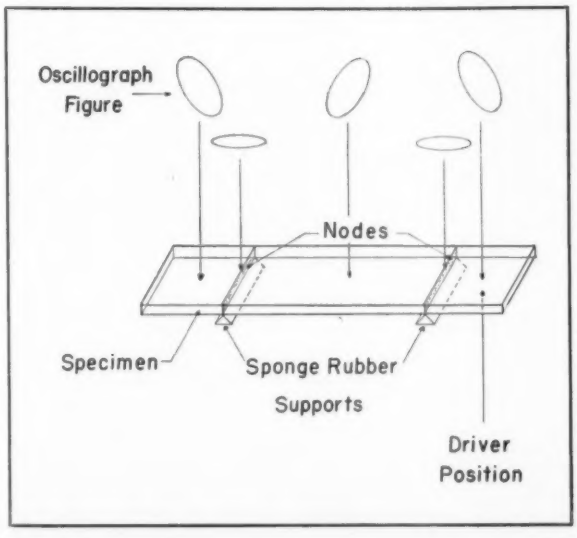
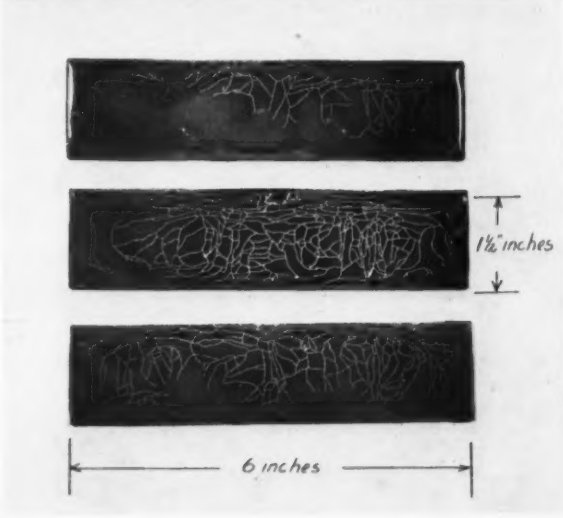


Figure 5 — Typical crack pattern produced by thermal shock. Samples were 6" long and 1½" wide each.



resting on sponge rubber supports near the nodal points, produces sound waves which are detected by a microphone placed directly over the specimen. The signal is then amplified by means of a vacuum tube voltmeter and fed into the vertical axis of a cathode ray oscillograph. The horizontal signal to the oscillograph is supplied by the signal generator. When resonance between the driver and sample occurs, an ellipse, or Lissajous figure, appears on the oscillograph. At this point the resonant frequency is read directly from the scale of the signal generator. To identify the mode of vibration, the pickup is moved along the length of the vibrating specimen. As a node is crossed, a change in the Lissajous figure will appear as shown in *Figure 4*. It was found that several higher modes of vibration could be excited without difficulty.

It should be pointed out that in addition to Young's modulus of elasticity, the shear modulus, or modulus of rigidity, can be determined by the sonic method. For this measurement, the sample must be vibrated in one of the torsional modes. The magnetic driver was found unsatisfactory for this purpose, and a mechanical method would probably be desired.

It is also interesting to note if both Young's modulus and the shear modulus were measured, Poisson's ratio could be calculated without difficulty from the formula

$$2(\mu+1) = E/G \qquad (3)$$

when μ is Poisson's ratio, E the modulus of elasticity, and G the modulus of rigidity.

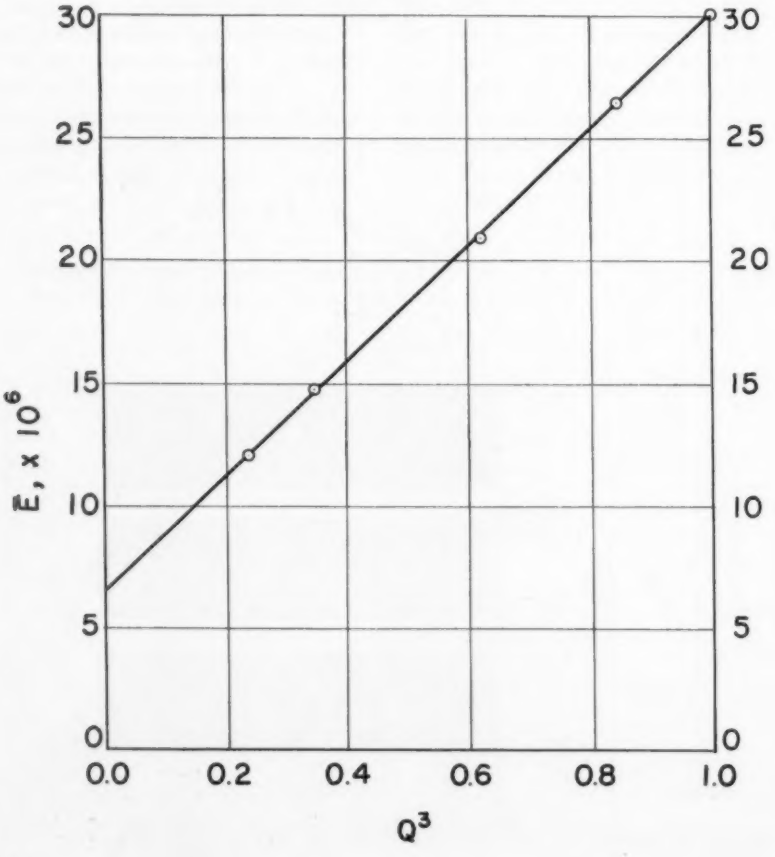
TABLE 1

Combined Data

Enamel Thickness in.	Q	Q^3	$\bar{E}$ x10^{-6} p.s.i.	σ x10^{-6} p.s.i.	$a\sigma$ x10^{-6} p.s.i.	$\pm\Delta_E$ x10^{-6} p.s.i.	No. of Samples
0.00	1.000	1.000	30.18	0.949	0.331	0.433	25
0.004	0.946	0.846	26.43	1.120	0.399	0.387	24
0.012	0.852	0.618	20.87	0.782	0.273	0.308	25
0.030	0.704	0.349	14.76	0.627	0.218	0.278	25
0.044	0.618	0.236	12.10	0.712	0.249	0.276	25
0.030*	0.704	0.349	14.80	0.697	0.262	0.282	22
0.012**	0.852	0.618	19.34	1.130	0.404	0.307	24

* Thermal Shocked
** Acid Etched

Figure 6 — The effect of thickness on Young's modulus of elasticity of a porcelain enamel-metal composite.



Analysis methods by statistics and theory of measurements

Since measurements of this nature are subject to errors from several sources, it is necessary that a method of analysis be adopted which allows the evaluation of the effects of discrepancies on the observed data. A statistical approach to the problem allows this to be done. For each set of data, the arithmetic mean, $\bar{E}$; the standard deviation, σ; and the limits of uncertainty, $a\sigma$, were calculated. The standard deviation is a measure of dispersion which is widely used and is obtained from the expression[8]

$$\sigma = \sqrt{\frac{\Sigma E^2 - \bar{E}^2}{n}} \qquad (4)$$

n being the number of samples tested. The limits of uncertainty are the product of the standard deviation and a constant value a, which is dependent upon the number of observations and probability considerations. Assuming confidence values of 90%, we can expect the value of $\bar{E}$ to lie within the range computed nine times out of ten[9].

To evaluate the maximum expected error arising from errors in individual measurements, the precision measure

to Page 62 →

8. *ASTM Manual on Quality Control of Materials*. American Society for Testing Materials, 1916 Race St. Philadelphia 3, Pa. 1951 127 pp.

9. ibid.

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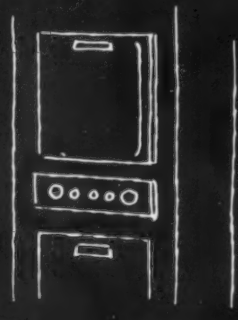

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A MACCO CASE HISTORY*

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*Actual case history, names, etc. can be had by writing today to

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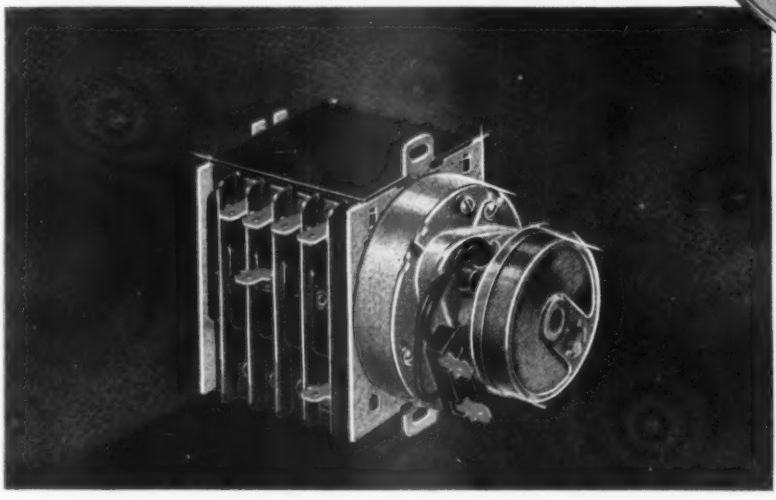
of time intervals in sequence
it's time you checked

the Soreng Timer



If your development project or present production requires an interval timer for programming an automatic washing-machine, dryer, dish-washer, window-fan, etc., then now is the time for you to check the Soreng Timer . . . and investigate the advantages of custom-engineered timers at low mass production prices. As a starting point, let us consider some of the characteristics of THE SORENG TIMER.

about the SORENG timer

Eight Double-throw switches with off position. Axial manual shaft on-off switch, available in out-off or out-on position.

Will control up to 16 different circuits.

Short interval circuits can be provided for spray or signal purposes.

Rating: To customer specifications.

Choice of bullet or spade type terminals.

Manual control shaft ¼" dia. with threads, flats, etc., to your specifications.

Clockwise rotation providing indexing of 45 and 60 distinct positions.

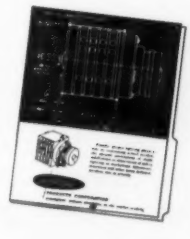
Shaft may be rotated *counter-clockwise* without damage.

Accuracy is obtained by synchronous timer motor.

Tandem or lateral motor drive arrangement.

Stepping control mechanism is simple in design and ruggedly constructed.

In keeping with the Soreng policy of engineering products to our customers' specifications, the timer characteristics provide ample latitude for your specifications to be incorporated in the basic design. For more complete data, drawings and our "Timer Cycle Analysis Form," write for Timer Bulletin SL-2 . . . it's the next step to custom-engineered timers at mass production prices.



Timer Bulletin SL-2

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OTHER SORENG PRODUCTS FOR THE APPLIANCE, AUTOMOTIVE AND AIRCRAFT INDUSTRIES

Market and statistical review of the appliance and

THIS is the second annual statistical review to be published in *finish*. We wish to thank the various organizations that assisted in the development of this material. With their continued fine cooperation we will hope to continue this annual feature.

The volume producing appliance and fabricated metal products manufacturing field produces millions of units a year which are in turn valued in billions of dollars.

In order to maintain this high rate of production, these plants must buy and use billions of dollars worth of materials, equipment, components and services.

Slight decline in production and sales in 1954

As expected the field saw a slight decline in production and sales in 1954 as compared with 1953. However, the reduction was much less than had been predicted and 1954 proved to be a good year.

The outlook for 1955 is bright

Industry leaders are looking forward to an excellent year in 1955. Various companies are looking forward to increases over 1954 of anywhere from 5 to 15 per cent. (see February '55 *finish*) NEMA expects electrical appliances to show an increase of about 6% overall this year.

SUMMARY OF SHIPMENTS

(Typical segments only—data not available for many important groups)

Product	Units Shipped 1953	Units Shipped 1954
Air Conditioners, room	1,044,691	1,230,000
Electric Appliances	64,367,300	59,712,000
Cooking & Heating Equipment (non electric)	9,975,369	8,967,606
Home Laundry Equipment	4,411,366	4,584,887
Plumbing Ware	5,561,193	5,841,017
Steel Containers	98,307,000	96,850,000
Steel Kitchen Cabinets	3,441,000	3,372,000
Vacuum Cleaners	2,777,756	2,658,136
Total Units	189,885,675	183,215,646

PLUMBING FIXTURES

(Units Shipped)

Product	1954	1953	1952	1951	1950	1949
Lavatories						
Cast Iron	1,342,389	1,337,865	1,217,333	1,630,554	1,813,000	1,385,000
Steel	248,301	213,293	219,374	232,699	276,000	153,000
Total	1,590,690	1,551,158	1,436,707	1,863,253	2,089,000	1,538,000
Kitchen Sinks						
Cast Iron	1,008,873	1,022,101	1,000,835	1,212,586	1,415,000	1,124,000
Steel	1,169,121	1,096,854	1,015,328	1,196,859	1,478,000	984,000
Total	2,177,994	2,118,955	2,016,163	2,409,445	2,893,000	2,108,000
Bathtubs						
Cast Iron	1,507,786	1,434,881	1,355,181	1,504,471	1,815,000	1,215,000
Steel	564,547	456,199	454,500	413,477	493,000	261,000
Total	2,072,333	1,891,080	1,809,681	1,917,948	2,308,000	1,476,000

Source: Plumbing Fixture Manufacturers' Association and Facts For Industry.

and metal products manufacturing field

ELECTRICAL APPLIANCES

(Sales)

Product	1953 Units	1953 Retail Value	1954 Units	1954 Retail Value
Coffee Makers	3,685,000	$ 73,515,800	3,218,000	$ 66,253,500
Dehumidifiers	90,550	12,224,000	95,000	12,825,000
Dishwashers	180,000	54,000,000	210,000	63,000,000
Fans	5,214,000	196,528,700	6,735,000	251,116,500
Food Waste Disposers	325,000	42,250,000	360,000	46,800,000
Freezers	1,090,000	436,000,000	975,000	385,125,000
Heaters	1,400,000	33,905,300	1,330,000	34,232,500
Hotplates	695,000	5,907,500	710,000	5,928,500
Irons	7,575,000	118,577,000	6,320,000	95,065,250
Radios	8,185,700	268,803,900	6,215,000	186,769,700
Ranges	1,250,000	318,750,000	1,165,000	304,065,000
Refrigerators	3,650,000	1,076,750,000	3,425,000	1,044,625,000
Roasters	395,000	17,380,000	350,000	13,982,500
Television	7,215,000	2,020,200,000	7,300,000	1,737,400,000
Toasters	3,170,000	57,721,500	3,100,000	52,594,500
Waffle Irons	1,370,000	29,455,000	835,000	15,823,200
Water Heaters	780,000	102,960,000	775,000	100,750,000
Water Systems	702,050	119,000,000	728,000	123,400,000
Other Small Appliances*	17,395,000	382,424,900	16,866,000	371,966,200
Total	64,367,300	$5,316,353,000	59,712,000	$4,911,722,350

*Including Blenders, Deep Fat Fryers, Floor Polishers, Food Mixers, Shavers, Broilers, Clocks.

Source: Electrical Merchandising.

COOKING AND HEATING EQUIPMENT—NON ELECTRIC

(Units Shipped)

Product	1953 Units Shipped	1953 Value		1954 Units Shipped	1954 Value
Cooking Stoves and Ranges	2,385,983	$205,819,000		2,207,489	$182,743,700
Gas	2,097,462		1,967,113		
Bungalow Ranges	53,223		37,539		
Coal & Wood	83,062		67,897		
Combination Ranges	34,630		25,667		
Kerosene, Gasoline & Fuel Oil	117,606		109,273		
Domestic Heating Stove	3,278,473	84,649,000		2,278,661	61,002,400
Floor and Wall Furnaces	551,614	36,198,000		539,894	31,063,100
Water Heaters	2,183,000	114,607,500		2,281,100	119,757,800
Oil Burners	579,696	58,320,000		528,580	56,062,300
Residential	540,774		494,259		
Commercial & Industrial	38,922		34,321		
Warm Air Furnaces	996,603	197,275,000		1,131,882	205,895,200
Total	9,975,369	$696,868,500		8,967,606	$656,524,500

Source: Gas Appliance Manufacturers Assn. and Facts For Industry.

ROOM AIR CONDITIONERS

(Units Shipped)

	1947	1948	1949	1950	1951	1952	1953	1954
Window-Sill Type	24,026	62,592	78,454	187,224	228,964	357,106	1,017,699	1,218,000
Floor Type	18,878	11,046	10,866	13,687	8,526	8,345	26,992	12,000
Total	42,904	73,638	89,320	200,911	237,490	365,451	1,044,691	1,230,000
Estimated Retail Value				($72,000,000	$86,500,000	$141,700,000	$349,514,000	$419,298,000)

Source: Air-Conditioning and Refrigeration Institute.

HOME LAUNDRY EQUIPMENT

Product	1953 Units	1953 Value	1954 Units	1954 Value
Domestic				
Washing Machines	3,460,396	$772,983,258	3,490,212	$ 807,781,875
Ironing Machines	154,466	33,051,090	86,205	17,844,435
Dryers	696,468	170,007,838	897,751	209,290,171
Sub Total	4,311,330	976,042,186	4,474,168	1,034,916,481
Export				
Washing Machines	86,123	17,941,143	91,156	20,199,058
Ironing Machines	5,106	708,508	3,635	451,758
Dryers	8,807	2,160,180	15,928	3,708,544
Sub Total	100,036	20,809,831	110,719	24,359,360
Grand Total:	4,411,366	$996,852,017	4,584,887	$1,059,275,841

Source: American Home Laundry Manufacturers' Assn.
Retail value estimated by *finish*

VACUUM CLEANERS

Product	1953 Units	1953 Estimated Retail Price	1954 Units	1954 Estimated Retail Price
Vacuum Cleaners	2,777,756	$262,277,000	2,658,136	$251,858,400

Source: Vacuum Cleaner Manufacturers' Assn.

STEEL KITCHEN CABINETS

	1953	1954
Units Sold	3,441,000	3,372,000
Retail Value	$178,000,000	$174,440,000

Source: Steel Kitchen Cabinet Manufacturers' Association.

STEEL CONTAINERS

(Annual Shipments)

	1948	1949	1950	1951	1952	1953	1954
19 Gauge & Heavier... 13 Gallons & Larger...	27,070,000	23,110,000	26,241,000	29,763,000	24,028,000	23,558,000	22,051,000
Lighter Than 20 Gauges 12 Gallons & Larger...	7,346,000	6,080,000	7,817,000	8,290,000	7,603,000	7,741,000	7,737,000
Heavier Than 29 Gauge 12 Gallons & Smaller..	57,255,000	52,765,000	66,129,000	73,681,000	61,286,000	67,008,000	67,062,000
Total	91,671,000	81,955,000	100,187,000	111,734,000	92,917,000	98,307,000	96,850,000

Today's output from the industry requires employment of approximately 12,000 people and the industry ranks second only to the automotive industry in the Nation's consumption of sheet steel.

Source: Steel Shipping Container Institute, Inc.

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Bolt Hole Brush	
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Color Oxides by Ferro	Complete Line of Laboratory Equipment
Magnetic Separators	Boric Acid • Ammonium Carbonate • Zinc Oxide • Borax • Bentonite, Purified • Gum Tragacanth • Sodium Nitrite • Magnesium Carbonate • Potassium Carbonate • Nephelite-Syenite • Single Nickel Salts
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New Processes for Industry

PAPER LAMINATED DIE STOCK FOR SHAPING METAL PARTS

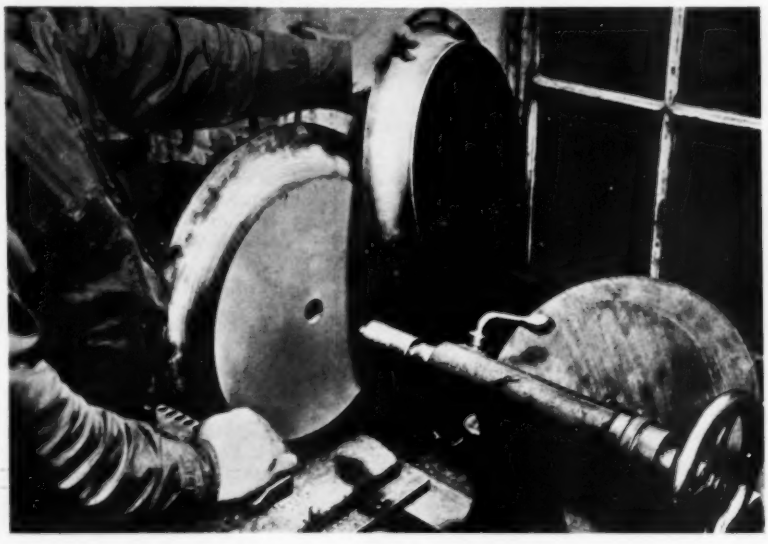
A NEW laminated die stock made from Bakelite phenolic resins is now being used to produce economical metal spinning chucks and other forms for shaping ductile non-ferrous metals, plastics, wood, etc.

Developed by The Formica Company, this paper-base laminate is strong, easy to machine and low in cost. It has a slick, smooth surface and is said to be eight times stronger than hard maple in dent resistance. These qualities suit the new material for use in pattern boards, gluing jigs, stretch forms and hydropress forms, for example.

Housings, ventilating rings

At Maryland Metal Spinning Co., Baltimore, Md., chucks formed of the new die stock are employed to form to unusually close metal spinning tolerances the housing for a delicate, precision-made weather instrument. Brass .040″ thick is spun to a tolerance of —0, + .007″ on a diameter of 3.409″, and inside overall dimensions and tolerances run + .005″, — 0.

A chuck 2¾″ thick, 29¼″ in outside overall diameter, is used at Maryland Metal to spin a 17 gauge cold rolled steel ventilating ring, with an inside flange 19½″ in diameter, for naval vessels. *(see photo below)*



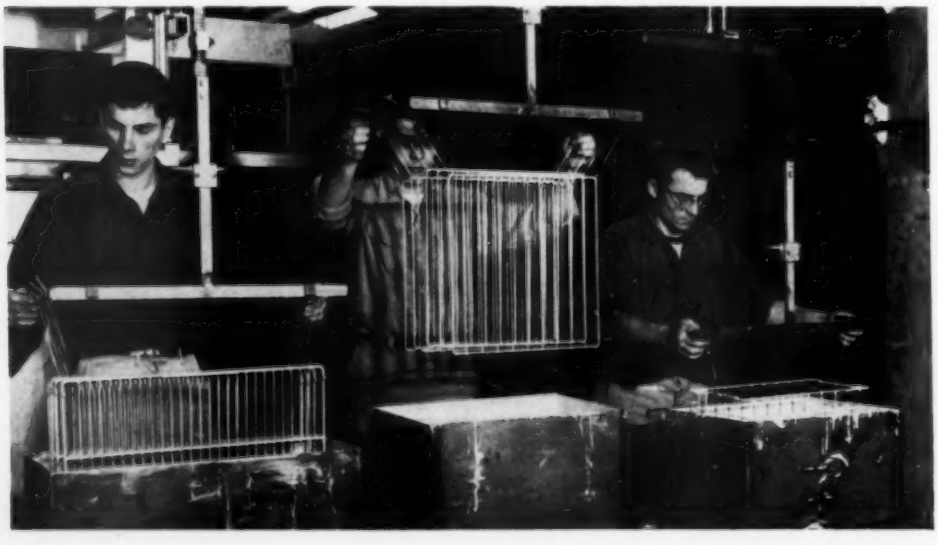
COLD DIP PLASTISOL FOR FREEZER BASKETS, SHELVES

DIPPING speeds up to 18 inches per minute are now possible with a new Unichrome cold dip plastisol coating.

As applied by Peerless Wire Goods Co., Inc., of Lafayette, Ind., to freezer baskets and shelves (in pastel shades of coral and light green), the plastisol offers an attractive protective coating against abrasion as well as corrosion due to humidity, moisture and foodstuffs.

The plastisols are applied to parts at room temperature over a special primer which requires a short bake at about 350° F. The coating is cured by baking at 350-365° F. for 20 to 30 minutes.

Another advantage of the new compound, due to its thixotropic (flow) properties, is that it deposits approximately 50% less material than some other plastisols while maintaining optimum film uniformity.



Freezer baskets and shelves being dipped in new-type plastisol compound at Peerless Wire Goods Co., Inc.

★

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These motors are made in three basic sizes—speeds from 1 to 200 r.p.m. with proportional torque from 5 to 500 in. ounces. Write today for descriptive information, prices and data sheet.

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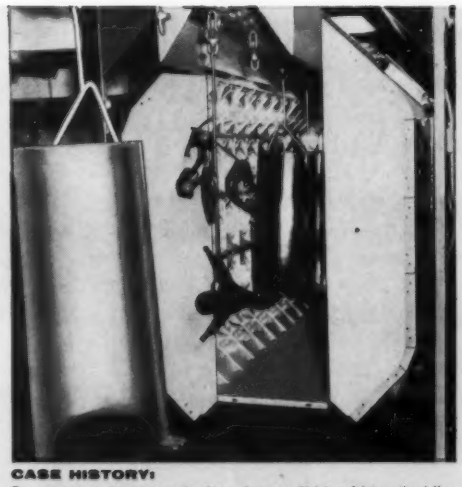

CASE HISTORY:

The above photo was taken at the Cream Separator Division of International Harvester at Richmond, Indiana. Operation shown is baking enamel finish coat on parts.

A few years ago, these parts were baked with a convection oven. It occupied 480 square feet of floor space and required a baking cycle of one hour.

The company now uses a Fostoria Radiant Oven. This unit cost's less to buy. It is only eleven feet long, and bakes thoroughly in just eleven minutes.

Does this give you an idea? If there is a baking, heating or drying operation in your plant, it can be done faster, cheaper, better, and in less floor space with a Fostoria Oven.

Find out about a specially-designed Fostoria Oven for your requirements. It'll pay for itself in a matter of months. Just contact our representative or write directly to the company.

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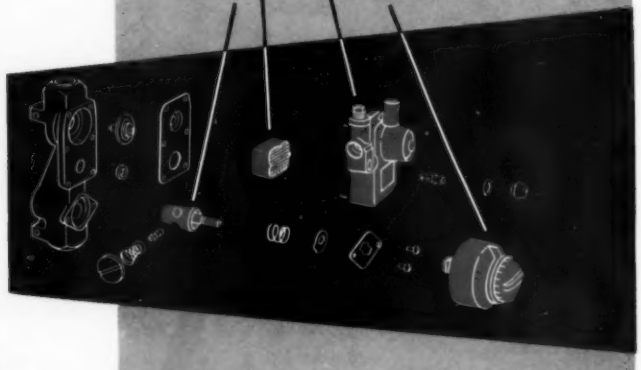

In the home, this new control means automatic convenience. Just set the timer dial for any period up to 4 hours, and it will shut off the main burner with the precision accuracy of a fine watch.

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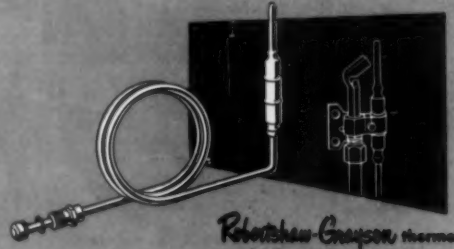

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Tool engineers meet on the West Coast

annual meeting held in conjunction with first western industrial exposition sponsored by American Society of Tool Engineers

OVER 40 leading engineers and executives discussed current industrial and production problems and technical developments during the 23rd annual meeting of the American Society of Tool Engineers.

The meeting was held in conjunction with the first ASTE Western Industrial Exposition held in the Shrine Auditorium and Exposition Hall in Los Angeles, March 14-18.

Following are a few reports on the many constructive papers presented at the ASTE annual meeting.

Benefits of plastic tooling

Plastic tooling's cost-cutting advantages in the aircraft and automotive fields have just begun to be realized, reported four Southern California plastics engineers.

In a panel discussion co-sponsored by the Society of Plastics Engineers, the "how-and-where" of plastic tooling was discussed by John Delmonte, general manager of Furane Plastics, Inc.; Louis E. Frost, tool engineer for North American Aviation, Inc.; Richard Morozowicz, plastics engineer for Douglas Aircraft Company, and George C. Adams, staff engineer for Rezolin, Inc.

"The hardest surface is not necessarily a mark of the toughest material", Delmonte cautioned the meeting. Maximum toughness is achieved by using glass cloth to reinforce the plastic material. Light weight of plastics and the ease and speed of their preparation give them definite advantages in many tooling applications for aircraft and automotive manufacture.

Frost cited the quickness of making engineering changes in plastic tools as an advantage in eliminating production tie-ups. Plastic tooling is not a cure-all, however, he said.

Morozowicz discussed the use of reinforced plastic layer tooling in the aircraft industry.

Urging development of a program of standardization for plastics, Adams said it "is not surprising that a certain amount of confusion, misinformation and misapplication of plastic tooling exists" because of the newness of the development. Standards will permit manufacturers to take full advantage of the cost reductions made possible by their use, he added.

Being tolerant with tolerances

Industry was urged to be more tolerant with tolerances or specifications for highly precise parts in order to achieve higher production at lower cost by a panel of aircraft and aircraft accessory quality control specialists speaking at a session co-sponsored by the American Society of Quality Control.

C. E. Deardorff, chief engineer for Bendix Aviation Corporation's hydraulic and electro-mechanical Pacific division, pointed up the importance of the tolerances or engineering specifications being understood by manufacturing and quality control people.

The greatest problem, he said, is to define a part on paper or in blueprints in such a way that the original concept can be interpreted in the same way by everyone who has any contact with the drawing.

"Airplanes are such a complex mechanism that the designers, in order to keep their costs to a half-way reasonable level, have been forced to confine their design drawings to new problems. All those problems which are common to previous designs have been recorded in a book and the designer no longer has to worry about them", R. F. Hurt, chief project planner for Lockheed Aircraft Corporation, told the session.

Hurt says the real problem is to find a way for the designer and the shop man to understand each other. This is done at Lockheed, he explained, by the planning division which supplies the "how to" information to the designer's "what" specifications. The personal touch, he stressed, will result in fewer misunderstandings and better production.

"Who inspects the inspector?" was answered by Frank H. Squires, quality manager for Lear, Inc. Squires said it was up to the quality control engineer to assure that inspection of completed parts and products is accurate.

"While the inspector's job is to catch human errors made by production personnel, we have the situation that the inspector is himself only human and can and will make errors", he added. Quality control evaluates the inspector's work and aids materially in keeping inspection accurate.

E. E. Bates, assistant to the director of Northrop Aircraft Company's quality control division, discussed the value of statistical quality control in cutting costs by reducing the number of rejected parts. By increasing the tolerances or specifications for precise parts by as much as a thousandth of an inch, he said production can often be speeded. He cited a case of a manufacturer who had turned a substantial loss into a profit by increasing the tolerances for mating parts.

Using frozen mercury to cut costs of intricate patterns

Industry is cutting costs for many intricately formed products by freezing their patterns of mercury at —100° F. according to Dr. Irvin R.

Kramer, vice-president of Mercast Corporation. Dr. Kramer described the use of frozen mercury for investment castings.

"The progress of civilization parallels the progress of the metallurgical processes", Dr. Kramer said in describing how frozen mercury's extremely low degree of expansion and its self-welding property permits casting of large and complicated parts.

Liquid mercury is poured into a steel die and frozen in an acetone-dry ice bath which is maintained at a temperature of −100° F., according to Dr. Kramer. He said industrial use of the frozen mercury process had grown rapidly since its introduction five years ago.

Sea water is source of "world's lightest metal"

"Each cubic mile of sea water contains four and a half million tons of magnesium", Raymond L. Nelson, Dow Chemical Company development engineer, stated as he described the metal's use in modern industry.

Magnesium is present in sea water in the form of magnesium chloride and can be easily recovered, Nelson said.

"For tooling, magnesium offers a unique combination of the lightest weight and best workability" for the purpose required, to achieve significant savings in both use and fabrication, Nelson stated.

With its light weight, magnesium has a rigidity that has made it valuable in inspection and quality control fixtures for the aircraft, household appliance, automotive, electronics and radar industries, Nelson said.

Manufacturers find over 20,000 uses for aluminum

"Today aluminum in one form or another is used by thousands of manufacturers in over 20,000 applications" ranging from tiny strands of wire to giant airliners, reported Dr. George Perkins, of Reynolds Metals Company.

"It is almost impossible to select an industry where the use of aluminum has not been found to be both practical and economical", said Dr. Perkins, who is general director of the Reynolds products and applications department.

Aluminum production in the United States increased from 164,000 tons in 1939 to over one and a quarter million tons in 1953, he said. Impetus for growth of the industry was development of heat treatment processes to add strength and hardness to aluminum and its alloys, he added.

Heat treating steel to withstand pressure of 280,000 lbs. psi

Heat treatment of steel so that it withstands pressures of 260-280,000 pounds per square inch enables California manufacturers to increase the size of commercial or military aircraft without increasing the weight of existing parts, stated A. V. Luebbers, Jr. and R. H. Lundquist of California-Doran Heat Treating Company.

"The specifications written to cover heat treating steel to this strength level are extremely rigid and exacting. It can readily be seen that for any part operating under such stress conditions, improper heat treatment would be catastrophic", they said.

Luebbers, California-Doran's chief metallurgist, discussed the various methods of hardening steel by heat treating. One of the methods he described was the heating of steel in melted salt in pots which are heated externally or by means of immersed electrodes.

Navy "cookie cutter" is effective against self-sealing fuel tanks

Production problems in the development of a Navy projectile which is "very successful against self-sealing fuel tanks" were described by W. R. Powl, plant engineer for Armstrong Cork Company.

The "Cookie-Cutter", as it is called by Navy Ordnance, both "ventilates and sets fire to the target. It travels at 20,000 miles per hour and rotates 300,000 times per minute. It is designed primarily for aircraft".

Development of the "Cookie-Cutter" was started in June, 1951, by Armstrong Cork. One of the major problems described by Powl was the Navy requirement that the deadly projectile remain unfired when dropped on the nose from a height of 40 feet.

Finding the right metal for the nose of the projectile was another problem. Early tests showed the metal nose was peeling back in flight before it got to the target. Tests developed a metal which withstands a force of about four tons to the square inch.

Production was started in August, 1952, and Powl said his firm had made four million "Cookie Cutters" since that time. He stated that the Harvey Manufacturing Company has a contract from the Army to produce the projectile on the West Coast.

Engineering education must develop executive ability to meet industry's needs

Modern industry is giving engineers more and more executive responsibilities. Engineering schools as well as in-plant training programs must change old practices to meet this new requirement, according to a panel of California educators and executives.

"Although over 40 per cent of the engineers in this country are employed in the manufacturing industries, specific training for the manufacturing function is a relatively new development. The majority of engineering curricula are directed toward design, even though only 15 per cent of American engineers are engaged in this function.

"The traditional division of engineering into branches such as civil, mechanical and electrical is in terms of what the engineer works with. From the standpoint of training, a much more meaningful classification is in terms of functions such as research, development, design, production, industrial and management", stated Ralph J. Smith, head of the engineering department of San Jose State College.

George W. Papen, manager of Lockheed Aircraft Corporation's production engineering department, said:

"The keynote of any in-plant training program is flexibility in the number of people involved, the subjects to be covered, frequency of repetition and in meeting current requirements. The training should be concentrated and capsuled so the new man's services are not delayed unnecessarily."

speaking of operations...

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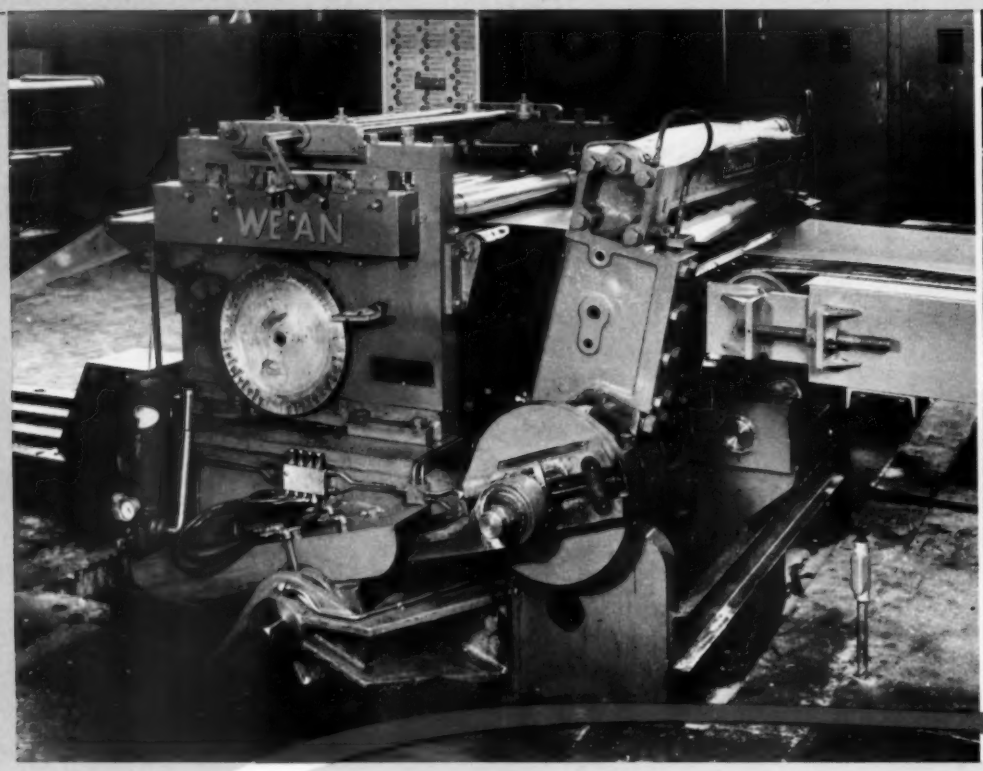

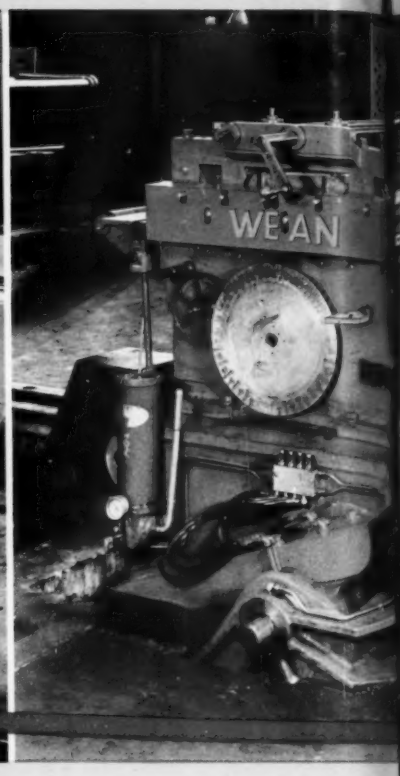

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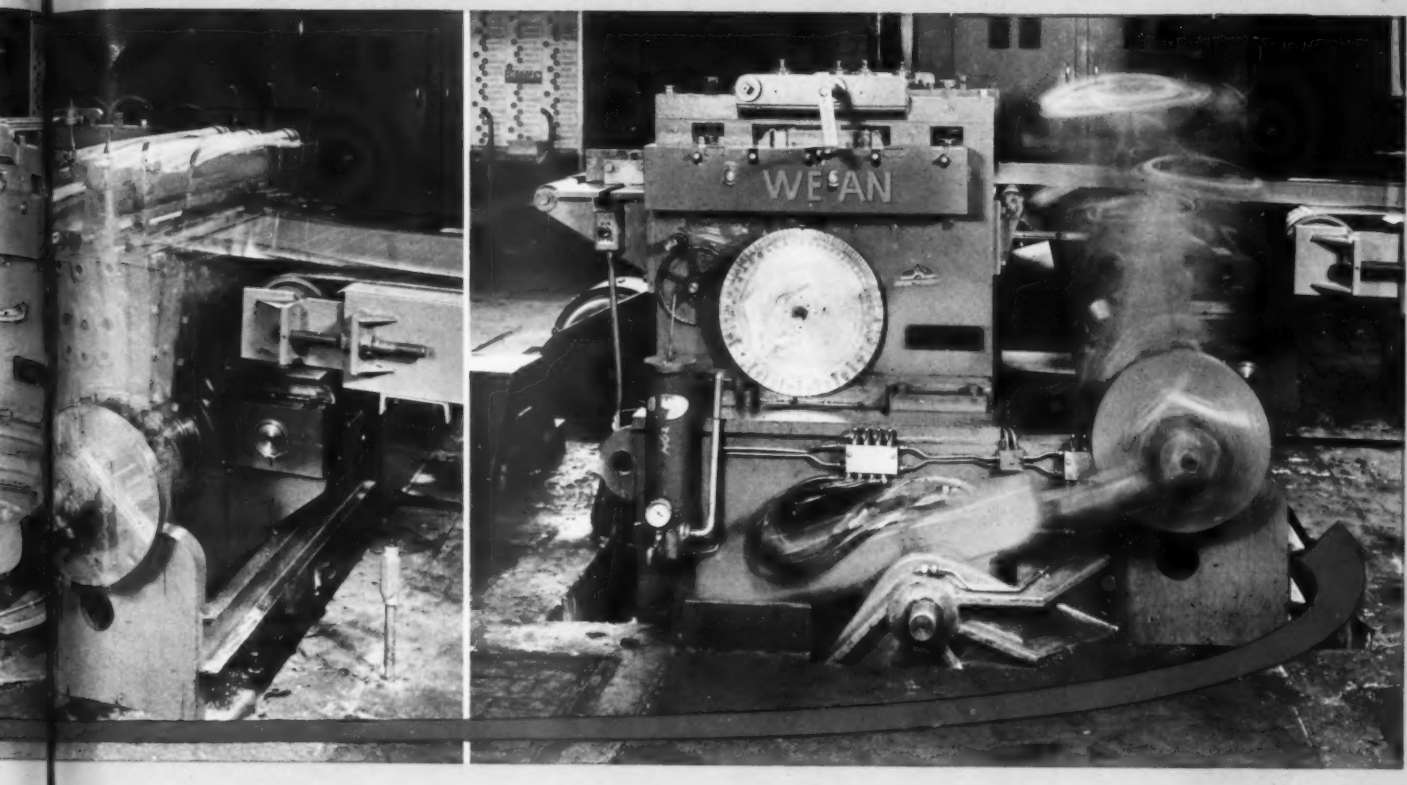

Flying Shear Line

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One-hundred cuts per minute to resquared tolerances . . . that's what users of the amazing new Wean Equipment Flying Shear and Slitting System are getting. That's why, if you are using steel in sheet form, it's important to you to get all the facts.

By purchasing steel in coil form you minimize the mill extras — that sometimes amount to more than $1.00 per hundred weight. You reduce considerably both the personnel required to handle and inventory large steel stocks and the space needed to store various cut sizes of steel of the same gauge and analysis.

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There's no comparison! The Wean Combination Slitting and Shearing Line is absolutely the last word in speed, precision and automatic operation. Before you buy let a Wean Equipment man show you one of these lines in operation. Talk with the operators. You'll be convinced. Simply contact the Wean office nearest you. They're listed below.

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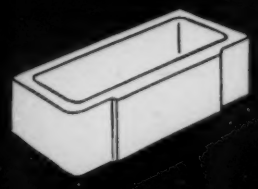

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Tint-Taniums have firmly established themselves in regular daily production in some of the nation's most respected appliance manufacturing plants. These colored frits, made exclusively by Chicago Vit, provide a number of distinct production advantages foremost among them being unequalled color stability. They are handled as easily as white titanium frits, and completely eliminate the chance for human error that exists in systems where colors are added at the mill. Tint-Taniums also bring you economic advantages, and give your finished products fresh new sales appeal. So, if you plan to use colors in your new products, you'll find it profitable to choose Tint-Taniums. There's nothing else like them!

Chicago Vitreous CORPORATION

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Porcelain Enamel Institute holds Pacific Coast conference

by Dana Chase • EDITOR

OFFICERS and staff members of the Porcelain Enamel Institute journeyed to Los Angeles for the 2nd Pacific Coast Conference held at the Biltmore Hotel, Los Angeles, March 10 and 11. It was a case of East meets West, for more than a "sprinkling" of those in attendance represented enameling plants of the east and midwest. At least one representative from British Columbia was present, N. G. Hodgson, of Alliance Ware, Ltd.

Thursday, March 10, was set aside for plant trips to facilities in the Los Angeles area such as: California Metal Enameling Co., Norris-Thermador Corp., and U. S. Porcelain Enamel Co., of Los Angeles, and Smoot-Holman Co., of Inglewood. Two sign companies, Advance Neon Sign Co. and Electrical Products Corp., were also included.

An informal meeting was also held by David E. Garen, ceramic coatings engineer, of the Bureau of Ships, for the purpose of outlining the Navy requirements for porcelain enameled materials and components. Prime purpose for the meeting apparently was to establish suitable West Coast sources for these Navy specification requirements, particularly bulkheads and submarine exhaust systems.

Present procurement interests are reported to include:

1. Bulkheads — steel/aluminum
2. Submarine mufflers used under wet exhaust system.
3. Small boat exhaust systems (including water jacketed pipe)
4. Snorkel exhaust piping
5. Snorkel exhaust valves
6. Smoke uptakes
7. Gas turbine engine liners
8. Exhaust liners (exhaust risers)

Service tests are being conducted on:

1. Salt water piping (flange sections)
2. Exterior portion of steam whistle and siren pipes.
3. Boiler casings
4. Crown frames for submarines (6″ H-beams)
5. Water heaters (heated by steam coils)
6. Rub board panels
7. Submarine superstructure plates
8. Anode holders (hold platinum anode)

A plant trip

Following the Bureau of Ships meeting, your reporter found time for only one of the Los Angeles area plants. (We are already making plans for a longer west coast visit that will enable us to visit the principal appliance and metal products producing plants on the Coast.)

It was our pleasure to tour the plant of California Metal Enameling Co. under the personal guidance of Joe Penton. If we may assume this to be a typical California plant, it would be apropos to comment that the "West Coasters" are on their toes with respect to processing techniques and particularly open-minded on the subject of new developments in fabrication and finishing.

The conference

Friday's meeting at the Biltmore was opened by W. A. Barrows, Barrows Porcelain Enamel Co., PEI *past president*. J. L. Hodgkinson, U. S. Porcelain Enamel Co., PEI *vice president*, presented the official welcome to the Pacific Coast.

The morning session comprised a series of reports on Institute growth, finances, PEI activities and market promotion by Edward Mackasek, *managing director;* P. B. McBride, *treasurer;* John C. Oliver, *secretary;* and Wm. Brinker, *administrative assistant*. Frit Division and Sign Division reports were presented by E. M. Hommel, The O. Hommel Co., and H. M. McE. Patton, Ingram-Richardson Mfg. Co., *chairmen* of their respective divisions.

An architect speaks out

Luncheon speaker on Friday was

Left below: Group photo taken at luncheon meeting during PEI Pacific Coast Conference. Right below: John Oliver, PEI secretary, explains Institute activities of interest to west coast enamelers.

Albert C. Martin, A.I.A., Albert C. Martin & Associates.

One of the newer structures in the Los Angeles area built of architectural porcelain enamel is the Consolidated Western Steel Building of U. S. Steel Corporation which was designed by the Martin firm. This building won the honor citation given by the Southern California Chapter of the American Institute of Architects. The Martin firm has designed other structures using porcelain enamel such as the May Company Valley Store, the new May Company West Covina Shopping Center, the Max Factor & Company building in Hollywood, Bethlehem Steel Company office and warehouse, and others.

In his talk Martin said, "We believe that the key to good architecture in Southern California is simplicity and the generous, but tasteful, use of color. Since porcelain enamel provides permanent color with low maintenance, it is a building material well adapted to the colorful style architects are bringing to Southern California."

Architect Martin suggested that the market for enameled metal building materials is "fabulous" if the industry can come up with the answer to an "assembled" product for walls. The principal Coast competition, he feels, may be a light-weight ceramic product.

Stainless and aluminum (used entirely) are *not* the final answer, Martin suggests. Depth and interest in multi story buildings can be obtained through the use of color.

When considering the application of enameled metal panels, the architect is often "the most confused person in the business". Industry must serve as the "expert" on research and development and educate the architect in the use details of the material.

The industry must establish standards, and the architect *must* be taught *proper* detailing when metal is to be used. Don't try "painted on designs", he said. Modular designs for fronts are coming, and the trend is to make the *structure* part of the exterior design.

Curtain wall and veneers both should have good futures if properly handled by industry and the architectural profession.

Water heater tanks— the "hot" subject

A discussion of porcelain enameled or "glass lined" water heater tanks produced peak attention at the Conference.

W. R. Greer, Pemco Corporation, presided, and discussion leaders were: Lee R. Erwin, Day & Night Division, Affiliated Gas Equipment, Inc.; George Landis, Rheem Mfg. Co.; and Paul L. Fowler, Fowler Mfg. Co.

Included in Erwin's comments were these:

Present methods of testing by weight loss may not be the final answer, but they "point the way" on solubility.

Sulphur water and magnesium anodes are not compatible. May cause bad odor and taste. Result — may be removed prior to installation —therefore, don't leave bare metal with the idea of *depending on* anodic protection.

Something should be done to get a standard specification for glass lined tanks. "Don't kill the 'goose with the golden egg' for lack of standards", said Erwin.

George Landis stressed the importance of proper fabrication techniques for the successful production of glass lined tanks.

A tank designed for galvanizing is *not* suitable for glass lining.

Annealing occurs during enameling, and metal gauges must be chosen with this in mind.

Radii are extremely important. (A good "rule of thumb" for internal radii — 3 times metal thickness).

Fowler outlined a few of his company's experiences in the production of porcelain enameled water heater tanks over a period of 20 years. *(See "This West Coast Plant Can Produce Porcelain Enameled Water Heaters in Quantity", by Gerald Eldridge Stedman, November, 1946,* finish.)

"I'm sold on 2 coat application," said Fowler, "but the one coat systems are doing a good job." His advice: Do the best possible job to get as near 100% coverage as possible and don't *depend* on rods for bare metal protection.

Architectural porcelain

Final topic on the Friday program was architectural porcelain. This is an important subject for West Coast enamelers, for their section has been credited with a great deal of progress in this specialized field.

J. W. Vicary, Ervite Corporation, chairman, PEI *architectural division,* reviewed the progress of the division and reported on the recent national meeting in Chicago. *(See "Is Architectural Porcelain 'Growing Up'?", March, 1955,* finish.)

West Coast architectural porcelain producers have been progressive in connection with promotion of the material on a cooperative basis and have been held up as an example of what could be done on a national basis. Their cooperative promotional program is handled by J. A. Rumer, executive director, Architectural Division, Porcelain Enamel Publicity Bureau.

This story of Pacific Coast activity just made the deadline for the April issue. Photos and more detailed information on specific subjects will appear next month.

PACIFIC COAST ENAMELERS HOLD MEETING

Pacific Coast Enamelers met at Rodger Young Auditorium, Los Angeles, on Friday, March 11, to play host to visiting representatives of the Porcelain Enameling Industry in the city for the PEI Pacific Coast Conference.

Featured speaker was Glenn A. Hutt, PEI *president,* vice president of Ferro Corporation. Hutt's subject was "Industry Responsibilities in Assuring a Bright Future for Porcelain Enamel".

Turnout for the meeting was indicated as 50% above normal.

The color trend hits steel office furniture

the old model "T" finish of office furniture—represented by olive drab or gray—is losing ground to new pastel colors

by F. E. Timlin • SECRETARY-TREASURER, PEERLESS STEEL EQUIPMENT CO., PHILADELPHIA

PRIOR to World War II the finishing of steel file cabinets was almost the same as the story concerned with the old model "T" Ford, wherein it was stated you could buy a model "T" Ford in any color — as long as it was black.

At Peerless Steel Equipment the black color of the model "T" was represented by the olive drab or olive green. Just before the advent of the second World War a change was noted. The gray color started to make its appearance in the field and where all handles, label holders, etc., were made of bronze a swing towards aluminum was noted.

Color answers the need for change in office decor

After World War II this change in color or color consciousness became more apparent, and the new pastel shades became very much in evidence. This change was apparently brought about by the fact many of the owners of businesses and those who used private offices felt they spent a greater part of the lives in offices and felt the decor should definitely be changed, and the apparent answer was color.

Starting the color trend

Decorators were called in, and the trend to color started. Today our company has a beige or tan color, pale greens and very light and dark grays. Along with these colors, Peerless also found it necessary to continue the old olive green color and the grained finishes, mahogany, oak and walnut. From this we establish the fact the finishing department in the office furniture industry has assumed added responsibility. The normal production procedure is now more involved and new production lines had to be set up to maintain the schedule to handle the various color effects. This change and problems it has brought about are common to the entire industry as well as our own company, but, as in other industries, we have met the problems and have come up with satisfactory results for both ourselves, our dealers and consumers.

This desk and card file cabinet are typical examples of Peerless office furniture which is available in beige, pale greens, and very light and dark grays—along with the older conventional colors of olive green and wood grain finishes.

1920 FERRO 1955

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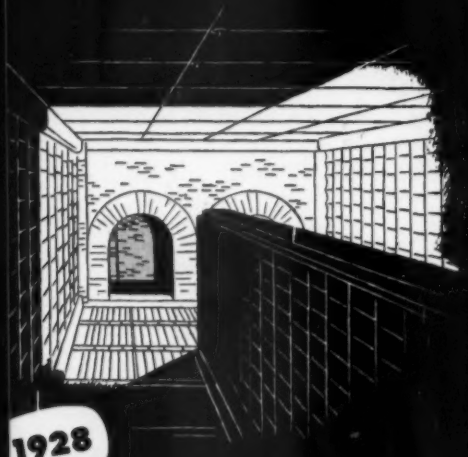
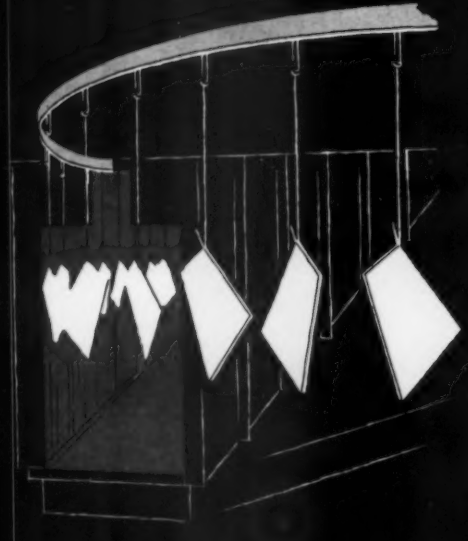


1928

Ferro builds first "U-type" Continuous Furnace for big production operations.

1955

Ferro "U-type" Continuous Furnaces in industry have annual capacity of nearly **3 BILLION** sq. ft. of Porcelain enamel ware.



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Sonic method for measuring Young's modulus of elasticity of porcelain enamel-metal composites

(Continued from Page 42)

of the calculated modulus is determined by a method outlined by Woodman[10]. The maximum error expected in E is designated by $\pm\triangle_E$, and is given by the general equation

$$\pm\Delta_E = \sqrt{\left(\frac{\partial E}{\partial C_1}\delta C_1\right)^2 + \left(\frac{\partial E}{\partial W}\delta W\right)^2 + \left(\frac{\partial E}{\partial n_1}\delta n_1\right)^2} \quad (5)$$

where δ is the precision measure of each variable. An expansion of formula (5), carried out by Willmore[11], yields

$$\pm\Delta_E = \sqrt{(\delta C_1 W n_1^2)^2 \; (\delta W C_1 n_1^2)^2 \; (2\delta W C_1 n_1)^2} \quad (6)$$

For this experiment:

$\delta C_1 = 5$ sec.^{2}/in.^{2}

$\delta W = 0.001$ lb.

$\delta n_1 = 2.5$ cycles per second

Substitution of the above values and typical or average values of W, C_1, and n_1 of a class into equation (6) yields the maximum expected error from the measurement.

By comparing the values of $\pm\triangle_E$ and $\pm a\sigma$, we can readily judge whether or not the variation in measured modulus values is due entirely to chance or to some other cause. If the value of $\pm a\sigma$ is of similar or smaller magnitude than $\pm\triangle_E$, the test is within reasonable control. However, should $\pm a\sigma$ prove to be larger than $\pm\triangle_E$, factors other than those of measurement are affecting the limits of uncertainty.

Experimental procedure

Fourteen gauge enameling iron was cut into 1½" x 6" sheets. Cleaning was done in a boiling alkaline solution, and the pickling operation in 6% sulphuric acid at 160°F. A double neutralizer solution of borax and sodium carbonate was used, followed by forced air drying at 200°F.

A commercial ground coat enamel was applied to the metal by dipping. To obtain very thick layers of enamel, the specimens were redipped and fired as many as three times. A firing temperature of 1530°F. was used for all pieces. A firing time of three minutes was used for the thin enamel layers and of five minutes for the thicker layers.

To evaluate the effect of disrupting the continuity of the coating, one group of samples was thermal shocked by heating at 500°F. for five minutes and quenching in water at 64°F. To visually determine the extent of thermal shock, the specimens were then "Statafluxed"[12]. A photograph of typical crack patterns is shown in *Figure 5*. A second group of samples was etched for one hour in a boiling solution of 6% citric acid.

Editor's Note:

Mr. Cowan's article represents the second prize winning paper in Ferro Corporation's fifth annual contest for best student papers on porcelain enameling. The author is a student at the University of Illinois.

Analysis of data

(1) Results

The results of the investigation are listed in *Table 1*. A graph showing the relationship between Young's modulus and the thickness parameter Q^3 is presented in *Figure 6*.

(2) Discussion of results

Modulus of elasticity is defined as the ratio of stress to strain below the proportional limit. Young's modulus is obtained when a sample is tested in flexure. It was this value which was determined in this investigation.

A low modulus of elasticity is usually desirable, for at a given value of strain, the corresponding stress will be less for materials having a lower modulus. In applications of repeated

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10. Woodman, "An Application of the Theory of Measurements to Certain Engineering Problems," *Bulletin, University of Missouri School of Mines and Metallurgy 15*, 1 (1942)

11. Willmore, "Some Aspects of Dynamic Testing of Refractory Materials: Sonic Method," M. S. Thesis, Dept. of Ceramic Eng., University of Illinois, Urbana, Illinois (1950)

12. Peterson, Allen, and Jones, "A New Method for Studying Fractures of Porcelain-Enameled Specimens," *Jour. Am. Cer. Soc. 31* 3, 186 (1948)

13. Stucket, "Enameling, Its Historical Development and Physico-Chemical Principles," *Ceramic Age 17*, 3, 138 (1931)

14. Seely, *Resistance of Materials*, John Wiley and Sons, New York, 1951 486 pp.

15. Harrison, Shelton, and Wadleigh, op. cit.

16. Parmalee and Shaw, op. cit.

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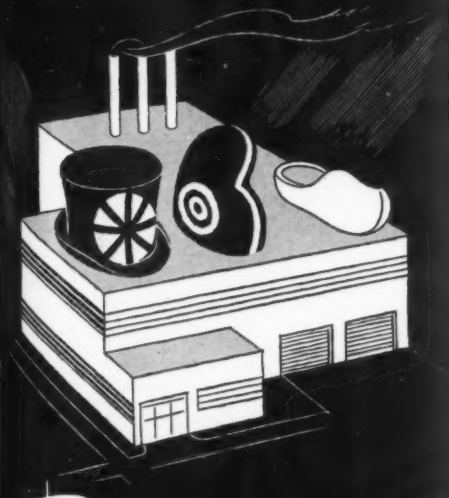

1930

Ferro builds plant in Holland, followed shortly by similar plants in England and France.

1955

Ferro European plants serve more than a **thousand** customers in 47 foreign countries.

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stresses, this is especially important as the fatigue strength of the composite is increased over that of uncoated metal, owing to a decreased overall stress level. A lower elastic modulus also produces smaller strains upon cooling an enamel on metal from a fluid state, for the forces necessary to bring the two surfaces to the same size will be less[13]. Impact resistance of porcelain enamels is likewise favored by a low modulus of elasticity, as the energy absorbed by a material is inversely proportional to its elastic modulus[14].

With reference to *Figure 6* it is seen that the observed data follows a straight line, which is in accordance with the theoretical considerations proposed by Wolford and Selby. Substituting the experimental values of $\overline{E} = 18.3 \times 10^6$ psi, $Q^3 = 0.500$, and $E_1 = 30.2 \times 10^6$ psi into equation (1), Young's modulus of elasticity of the porcelain enamel layer is found to be 6.4×10^6 psi. This value is considerably smaller than those found by Harrison, Shelton, and Wadleigh of 9.6 to 9.9×10^6 psi. It is however more consistent with the work of Parmalee and Shaw, who listed moduli of 6.5 to 9.4×10^6 psi, and with that of Wolford and Selby, who obtained a value of 7.2×10^6 psi. A very likely source of variation among investigations is due to different enamel compositions which were used, for it has been shown[15,16] that compositional alterations vary the elastic modulus to some extent. Since the sonic method of dynamic testing is done at a stress level which is essentially zero, the results obtained may frequently be smaller than those determined statically.

The linearity of the observed data is an indication that the method is consistent. A comparison of the values of $\pm a\sigma$ and $\pm\triangle_E$ in *Table 1* shows that the limits of uncertainty are less than the maximum expected error in most cases. From this comparison, it can be concluded that the test was controlled and no extraneous variables entered into the process. Thickness variation within the individual specimens was a source of error, as it displaced the nodes and may have resulted in spurious resonant frequencies.

to Page 64 →

1920 FERRO 1955

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1930

Ferro develops new "domestic" P.E. clays, better and more uniform than imported clays previously used.

1955

Ferro introduces new "Ferro-Processed" Clays, with better set, adherence and surface characteristics.

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THE FINISHING TOUCH

VERSATILITY OF ALUMINUM FINISHES

by A. H. Kirkpatrick
Stevens Special Project Engineer

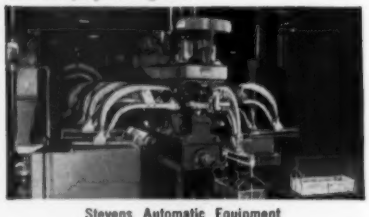
A look at the 1955 design engineer's drawing board leaves little doubt that aluminum is past adolescence.

Aluminum responds to any number of finishing processes. Polishing and buffing will produce both satin and mirror bright finishes. Barrel Roto-Finishing will remove minor surface irregularities and improve the finish of small castings and forgings.

Stevens L. V. Experimental Aluminum Buffing Operations.

Many chemical and electro-chemical immersion finishing processes, including anodic etching, electroplating, anodizing, electropolishing and bright dipping add versatility to the finishing of aluminum. In anodizing, dyes can be added for brilliant colored finishes.

Aluminum's coming of age makes the task of producing these aluminum finishes a real job for the project engineer.



Stevens Automatic Equipment for bright dipping of aluminum.

Today, increased production, lowered costs and improved finishes, resulting from automatic, **job-qualified**, finishing installations are available to finishers of aluminum through Frederic B. Stevens, Inc. Stevens experience in the field of aluminum finishing ranges—

From the anodizing of refrigerator trays to the coloring of tumblers . . .

From the plating of automotive trim to the buffing of light reflectors . . .

From tumble finishing of aircraft assemblies to the alroking of rivets . . .

Stevens can engineer and build complete automatic or still tank installations for any chemical or electro-immersion aluminum finishing process —furnish the supplies and equip your company to do the best job at **lowest** cost. If it's made of aluminum we know how to finish it. Call in your nearest Stevens representative or write direct to:

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YOUR METAL FINISHING SUPERMARKET
DETROIT 16, MICHIGAN

The effect of thermal shock upon Young's modulus is shown in *Table 1*. It is to be noted that producing an extensive series of cracks in the enamel coating did not affect the elastic modulus within the limits of measurement. The thermal shock treatment was not sufficiently severe to cause the enamel to break away from the metal, but numerous cracks were detected with the aid of the "Stataflux" equipment as shown in *Figure 5*. The manner in which the thermal shocked specimens vibrated was probably not greatly different from that of samples whose coating was continuous, due to the low level of applied stress. Had the testing been done statically, entirely different results may have been observed, since greater stress would tend to cause a portion of the enamel to chip away.

Destroying the enamel surface by a chemical etch was found to decrease the elastic modulus. It is to be noted however, that the limits of uncertainty of this group were larger than the expected error. This is an indication that additional factors affected the value of $a\sigma$. It was observed that following the acid etch, the surface of the coating was of a powder-like nature and was easily brushed off. Since this material was not removed prior to testing, it is probable that measurements of thickness partly represented a substance which contributed nothing to the modulus of elasticity of the composite. Had this extraneous material been removed, the thickness values would have been decreased with higher modulus values resulting. An uneven attack of the acid over the enamel surface was also noted which was a likely cause of further error.

Conclusions

Observations of this investigation allow the following conclusions to be drawn:

1. The sonic method of measuring Young's modulus of elasticity is especially well suited to porcelain enamel-metal composites. The data and theory correlate well and statistical analysis indicates good test control.
2. The low level of stress used in sonic testing may result in moduli which are of lower magnitude than those determined statically.
3. Disrupting the continuity of the enamel coating does not affect the sonic modulus of elasticity of the composite.
4. Acid etching of a porcelain enamel results in an apparent lowering of the elastic modulus of the composite.

Acknowledgment

The author wishes to express his appreciation to Prof. A. W. Allen and Dr. A. L. Friedberg of the Department of Ceramic Engineering, University of Illinois, for their continued interest and suggestions throughout this investigation.

Flow coating zinc chromate primer at Northrop

(Continued from Page 37)

that even small diameter aluminum tubing required but a single pass.

The flow coat booth is key to the entire finishing process. Nozzles and their pressure, plus viscosity of the zinc chromate determine the thickness of the dried coating.

Nozzles are fed from an exterior system of storage tanks, regulators and pumps. There's a primer storage tank with a capacity of 140 gallons. Next to that is an "operating" mixing tank — where zinc chromate is mixed and thinned, and from which cut primer is pumped to nozzles. The operating tank holds 123 gallons. Nearby is a thinner tank, capacity 140 gallons.

Primer from the storage tank is pumped to the operating tank via a 1½-inch paint pump, cap. 20 gpm at 10-15 psi, driven by a 1½ hp 220/440 volt, 60 cycle, 3 phase, explosion-proof motor. Primer pulled into the operating tank passes a motor-driven filter en route. A 3″ paint pump, cap. 100 gpm at 10-15 psi and driven by a 5 hp explosion-proof motor, carries thinned primer from operating tank to nozzles. This same pump-motor combine also circulates thinner through the system at day's end to clean both nozzles and booth.

The flow coat booth is aerated via

a 12 x 24-inch exhaust stack, employing an above-roof exhaust fan. Fan has a capacity of 5690 cfm.

As we've said, finish thickness depends upon the zinc chromate primer's viscosity. Every 15 minutes the operating tank is sampled to assure a ratio of 2½ parts thinner to 1 part primer.

A sample is taken in a 77 ml cup. The cup, contents and lid are weighed on a torsion balance scale. By consulting a graph (charting weight per gallon), the operator gets a figure which in turn is multiplied by the volume in the operating tank. This volume is measured in inches. Usually, about 1½-2 gallons of thinner are added every 15 minutes. This emphasizes loss of thinner through evaporation and stack carry-off. However, thinner is far less expensive than primer. "We lose very little primer up the stack," says Niles.

Infra-red drying at 150-180° F.

To dry the work 192 infra-red lamps (in two banks) are employed. Infra-red radiation raises the work temperature to 150-180° F. in this 14-ft. zone. Actually, the dryer also handles two other lines carrying parts finished in a traditional water-wash spray booth.

The color of zinc chromate over the base metal provides a quick and fairly accurate gauge of coating thickness. Admittedly, the color of the coating will vary according to the relative color of its background (base metal or the anodized surface). Yet color serves as a quick inspection method—and operators, with some experience, find it a useful and practical coating guide. Light backgrounds produce films semi-green in color while darker surfaces (anodized areas) appear dark green.

It might be noted that the viscosity of the packaged, uncut primer is rated between 3.5-5 "poise absolute" at 25° C. (77 degrees F.) (22-27 seconds on Zahn G5 cup).

Northrop process men believe that flow-coating can be adapted to other low-viscosity finish applications. It is likely that extrusions of titanium and magnesium will eventually be finished by the flow coating method.

WYANDOTTE CHEMICALS

Specialists in Industrial Cleaning Products

"Wyandotte Industrial No. 6 is the BEST NEUTRALIZER we've ever used!" —*Magic Chef, Inc.*

Magic Chef, Inc., St. Louis, Missouri, produces high-quality ranges. Naturally, they demand high-quality products in their processing operations. Read what they say about Wyandotte Industrial No. 6:

"Industrial No. 6 completely eliminated two problems we previously had," reports Mr. Martin Haselhorst, enamel superintendent at Magic Chef. "One was the hanging which resulted where two pieces of ware touched in the pickle basket to cause slow draining of ordinary neutralizer solutions.

"The other problem was excessive foaming, which made it impossible to operate the neutralizer tank at more than 190° F. At this temperature, the drying of the ware was a problem.

"Wyandotte Industrial No. 6 has eliminated the hanging which reduced 'wash - off' considerably.

"We also use another specialized Wyandotte product with excellent results for alkaline cleaning in our pickling department. With the use of Wyandotte cleaners, we have been able to *reduce our costs and improve our products.*"

Ask your Wyandotte metal-cleaning specialist about W.L.G.* — heavy-duty alkaline cleaner — and Wyandotte MK, an additive, which speeds cleaning action. Wyandotte R-2 is for extreme rust conditions; can be added to Industrial No. 6 to insure long storage of ware without rusting. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California.* *REG. U.S. PAT. OFF.

Largest manufacturers of specialized cleaning products for business and industry

Wyandotte CHEMICALS

Helpful service representatives in 138 cities in the United States and Canada

Try Century Vit
TITANIUM WHITE

1. COLOR STABILITY
2. HIGH REFLECTANCE
3. HIGH OPACITY
4. GLOSS
5. TEXTURE
6. WORKABILITY

With Century Vit Titanium cover coat over Century Vit ground coat enamel you have an unbeatable combination for adding beauty and durability to your appliance or other metal product.

Century frits are *time proved* in production plants before they are sold to you. The titanium frits give you the six characteristics: color stability, high reflectance, high opacity, gloss, texture and workability, so important to your plant and finished product.

Then too — you will save money 1) in frit cost and 2) on the production line.

A Century field engineer can show you how to improve your product and save money too if you will let us hear from you now.

FRIT from CENTURY
FRIT MASTERS

CENTURY VITREOUS ENAMEL COMPANY

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PHILCO NAMES OELKERS

Appointment of Wilson H. Oelkers as a vice president in charge of purchasing, Philco Corp., has been announced by James H. Carmine, president.

Oelkers was previously general purchasing agent.

RCA ESTATE NAMES MARKEL

Appointment of Donald H. Markel as manager of quality control, RCA Estate Appliance Department, Radio Corp. of America, Hamilton, Ohio, has been announced by Ellsworth Simms, manager of manufacturing.

PACKARD WINS AWARD

Development by Packard of the torsion suspension system in American production cars has won for the Studebaker-Packard Corp., Detroit, Mich., the Universal Travel and Auto Sports Show's 1955 International Award for the "outstanding automotive advancement of the year".

CORY NAMES MATSON

James B. Matson has been appointed assistant to the president, Cory Corp.

ADMIRAL EXECUTIVE CHANGES

Several major executive appointments have been announced by Ross D. Siragusa, president, Admiral Corp., Chicago, Ill.

John F. Gilbarte, manager of the government sales division, has been elected to the newly created post of vice president — government laboratories division.

Edmond I. Eger, vice president — advertising, has been elected to the board of directors.

John B. Huarisa, executive vice president and one of the original founders of Admiral, has been named to the post of treasurer, and George E. Driscoll, secretary, to assistant treasurer.

Lynn C. Park, treasurer and board member, has retired after 37 years with the company.

KLEIN JOINS NORGE

Appointment of Warren O. Klein as assistant manager of key accounts for Norge Div., Borg-Warner Corp., Chicago, has been announced by R. C. Connell, vice president of sales.

Klein formerly worked for Gibson Refrigerator Co., Greenville, Mich.

WESTINGHOUSE DIV. NAMES BENEDICT MFG. ENG. MGR.

Frank R. Benedict has been appointed manufacturing engineering manager, Sturtevant Div., Westinghouse Electric Corp., Hyde Park, Mass., it was announced by G. C. Derry, division manager.

JANUARY GAS RANGE SHIPMENTS UP 13.2%

Shipments of domestic gas ranges during January were 13.2% above those for the same period last year, according to the Gas Appliance Manufacturers Association.

During January 155,100 ranges were shipped to distributors and dealers as compared to 137,000 shipped during January 1954.

JAN. VACUUM CLEANER SHIPMENTS 15.3% OVER DEC.

Factory sales of standard-size household vacuum cleaners in January were 250,123 units, or 15.3% over 217,022 cleaners sold in December and 13.1% over January, 1954, announced the Vacuum Cleaner Manufacturers' Association.

WHIRLPOOL BUYS MOTOR PRODUCTS MARION, OHIO, PLANT

The Marion, Ohio, plant of Motor Products Corp. has been purchased by Whirlpool Corp., St. Joseph, Mich., it has been announced by D. W. Alexander, vice president in charge of operations, Whirlpool.

The 250,000 sq. ft. plant will be converted to the manufacture of automatic gas and electric clothes dryers.

EMERSON ELECTRIC NAMES O'NEILL

It is reported that Edward L. O'Neill has been elected vice president and general sales manager, Emerson Electric Mfg. Co., St Louis, Mo.

GAMA ACCEPTS SIX NEW MEMBERS

Six new members were accepted by the Gas Appliance Manufacturers Association during January, according to managing director H. Leigh Whitelaw.

The following additions make a total of 593 member companies: Superbo Mfg. Co., Los Angeles, Calif.; Thermogray, Jefferson, Iowa; Westomatic Water Heater Mfg. Co., Citra, Fla.; Garland Commercial Ranges, Ltd., subsidiary of the Detroit-Michigan Stove Co., Detroit; Steel City Furnace Corp., Springdale, Pa., and F. J. Winchel Co., Cleveland, Ohio.

NORGE TO SPEND $2,500,000 ON EXPANSION PROGRAM

A $2,500,000 expansion and retooling program at two plants has been announced by Norge Div., Borg-Warner Corp., Chicago.

Additions will be built to factories in Effingham, Ill., and Herrin, Ill.,

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AUTOMOTIVE, APPLIANCE INDUSTRIES TO HELP MAKE '55 BEST YEAR IN DIE CASTERS' HISTORY

The increased automotive die casting consumption and applications in major appliance industries spurted 1954 sales to $268,000,000. Of the four metals which are die cast commercially, zinc was the leader by weight. Output of zinc-base die castings was 292,000,000 lbs.; magnesium die casting volume reached 3,720,000 lbs.

The American Die Casting Institute estimates that 1955 will reach a record $400,000,000. Supporting this bold estimate is the greatly increased consumption by the automobile industry, the die casters' biggest customer. New aluminum applications, especially in the major appliance field — second largest die casting market — are reflected in this metal's rising consumption.

is your paint department a problem child?

- Are you getting consistent finishing room quality control?
- Are you satisfied with the appearance of your finished product?
- Are rejects throwing your costs out of line?
- Are time and material costs eating up your profits?

We have the answers...

From TV sets to kitchen cabinets, from water heaters to new automobiles, Spee-Flo engineers from coast to coast have an enviable record of assisting manufacturers with their "problem child"—the paint department.

Paint department headaches will disappear with Spee-Flo Hot Spray Heaters. Production costs will drop and consistent, all-weather quality control will be established.

We'll be glad to show you facts and figures on how other manufacturers in your field are producing better products at lower cost. Spee-Flo Hot Spray Heaters pay for themselves in the first few weeks of operation . . . they are long lived and trouble free.

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Builders of greatest industrial and automotive hot spray equipment.
Please send me information on your line of hot spray heaters best suited to our work. Type of products being finished_____
Application is conveyorized_____ turntable_____ mobile_____ other_____
Average volume of material per gun per hour_____
Type of material_____ Please have representative call_____
Name_____
Company_____
Address_____
City_____ State_____

8304

SPEE-FLO
HOT SPRAY HEATERS

SPEE-FLO CORPORATION
720 POLK AVENUE • HOUSTON 2, TEXAS

to provide approximately 200,000 more square feet of manufacturing and warehousing space, Virgil C. Rice, vice president of manufacturing and engineering, said.

Construction and retooling operations are scheduled for completion by June 1, 1955.

WESTINGHOUSE PUTS PRESSURE ON PORTABLE APPLIANCE SALES

"Westinghouse will expand its portable appliance sales force to 150% of its 1954 size and materially step up advertising and promotional expenditures in a 1955 drive aimed at record-breaking sales objectives," it has been revealed by R. M. Oliver, manager of portable appliances, Westinghouse Electric Appliance Div., Mansfield, Ohio. "Expansion of wholesale distribution to meet these goals has been virtually completed, and volume this year is expected to top '54 by at least 15%", he said.

G-E EARNINGS 28% OVER '53

General Electric Co., Schenectady, N. Y., net earnings for 1954 reached an all-time high of $212,613,000, 28% over the 1953 total of $165,728,000, it has been announced by Ralph J. Cordiner, president.

JANUARY GAS WATER HEATER SHIPMENTS UP

Gas water heater shipments totalled 198,300 units during January, 1955, 20% over January, 1954, according to Edward R. Martin, director of marketing and statistics, Gas Appliance Manufacturers Association.

ANNUAL MEETING OF MINING AND METALLURGICAL ENGRS.

The annual meeting of the American Institute of Mining and Metallurgical Engineers was held in the Conrad Hilton Hotel, Chicago, Ill., February 14-17.

Twenty-five hundred engineers from all parts of the world attended the 84 technical sessions and participated in the presentation of 400 different technical papers.

AHLMA '54 SALES FIGURES

Factory sales of household washers, dryers and ironers in 1954 totalled $1,033,537,442, retail value, and amounted to 33.5% of the year's expenditure of $3,081,439,942 for dishwashers, food freezers, ranges, refrigerators, vacuum cleaners and home laundry equipment, according to Guenther Baumgart, executive director, American Home Laundry Manufacturers' Association.

PACKARD NAMES GRAVES & MISCH

It is reported that William H. Graves has been elected vice president and director of engineering, and Herbert L. Misch has been named chief engineer, Studebaker-Packard Corp.

WHIRLPOOL TO BUILD NEW PLANT

Plans have been approved for the addition of a new porcelainizing plant in St. Joseph, Michigan, to cost approximately $2,000,000 and add 50,000 square feet to present production area, it has been announced by D. W. Alexander, vice president in charge of operations, Whirlpool Corp.

The new facilities will be used for applying porcelain enamel to component parts for automatic washing machines and clothes dryers.

REPUBLIC HEATER BUYS ODIN STOVE

It is reported that Odin Stove Mfg. Co., Erie, Pa., has been sold to Republic Heater Corp., Los Angeles, Calif., by Dearborn Stove Co., Dallas, Texas, the parent organization.

KAWNEER CHANGES CORPORATE RESIDENCE

Stockholders of the Kawneer Co., Niles, Michigan, have voted for the adoption of an agreement of merger which will change the residence of the

New AHLMA industrial relations committee — *constituted under Guenther Baumgart, executive director, American Home Laundry Manufacturers' Association, held its first meeting on March 1 in Chicago. Front, left to right: William D. Fowler, Whirlpool; R. M. James, Westinghouse; E. E. Folsom, General Electric; Kirkland Sloper, Easy Washing Machine. Standing, left to right: J. B. Murray, Speed Queen; H. C. Tipping, Crosley-Bendix; George J. Matkov, Maytag; Frazer F. Hilder, of Cann, Lamb, Long & Kittelle; Harold G. Clarke, Ernst & Ernst; and Guenther Baumgart.*

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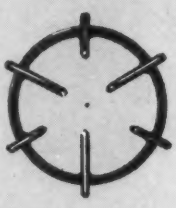

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RANGE BURNERS

SERVICE-TO ENAMELERS tells in three words the story behind the growth of New Process D-Enameling Corporation. Management and production people alike have learned that D-Enameling is a profit maker—worth far more than the negligible effort involved in putting the damaged parts aside for shipment by truck or rail to our plant.

Now, New Process launches another special SERVICE TO ENAMELERS . . . wet process cast iron enameling! Now, New Process becomes a central source of supply with large volume-low cost production for this special work which relieves range plants from the nuisance of having to run these parts on a special shift. You'll be surprised how economically we can enamel grates, burners and other cast iron parts for you. Won't you give us the opportunity to quote?

New Process *D-Enameling* Corp.

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company from Michigan to Delaware.

The agreement of merger does not indicate any basic change in the company's business or operations, the report states.

MEEKER VICE PRESIDENT TOLEDO PORCELAIN ENAMEL

Daniel Meeker has been named vice president, Toledo Porcelain Enamel

Products Co., Toledo, Ohio, it has been announced by Sylvan F. Chappuis, president.

Meeker has been with Toledo Porcelain Enamel since 1931, in the capacities of plant engineer, architectural engineer, district manager, plant superintendent and sales manager.

MCGRAW BUYS LONERGAN

It is reported that the purchase of the assets of Lonergan Mfg. Co., Albion, Mich., has been completed by McGraw Electric Co.

Lonergan is being operated as a McGraw division, headed by S. J. Lonergan, founder.

RECORD BREAKING ATTENDANCE AT HOUSEWARES EXHIBIT

Previous buyer attendance records were shattered during the 22nd National Housewares Exhibit at Navy Pier, Chicago, according to A. W. Buddenberg, executive secretary, National Housewares Manufacturers Association.

A total of 9,202 buyers were in attendance from 47 states, Canada and 17 foreign countries.

HARRINGTON MAYTAG STEEL BUYER

Leo C. Harrington has been named a steel buyer for The Maytag Co., Newton, Iowa, according to W. F. Langefeld, director of purchases.

WHIRLPOOL '54 SALES 13.6% OVER '53

Net sales of Whirlpool Corp. for 1954 totalled $169,453,888, compared to $149,129,142 in 1953, an increase of 13.6%, according to Elisha Gray II, president.

Net earnings were $9,185,033, compared with $4,203,036 for 1953.

SAHLOFF G-E VICE PRESIDENT

Willard H. Sahloff, general manager, General Electric Co. Small Appliance Division, Bridgeport, Conn., has been elected a vice president, according to Ralph J. Cordiner, president.

FEDERAL SIGN '54 EARNINGS

The highest net income and earnings in the 54-year history of Federal Sign and Signal Corp., Chicago, have been reported by the company for 1954.

Net income from operations was $605,358 in 1954, compared with $428,781 for 1953, but net sales decreased to $10,097,275 from 1953's $10,445,649.

IBM NAMES SCHNACKEL & BECKER

It is reported that Jay W. Schnackel has been named vice president — manufacturing, International Business Machines Corp., New York City.

Arthur L. Becker has been appointed general manager at the Endicott, N. Y., plant.

MCCRAY NAMES ANDRYSIAK

J. W. Krall, president, McCray Refrigerator Co., Inc., has announced the appointment of Eugene J. Andrysiak as works manager.

FOSBOND FORUM

This column carries quotes from technical papers delivered on the subject of phosphate coating; answers questions about the use of Fosbond, Pennsalt's trouble-free phosphatizing process.

IRON PHOSPHATE COATING ADVANTAGES

The Pennsalt Fosbond "20" series of iron phosphate coatings was first developed to overcome certain of the known disadvantages of zinc phosphates. They have now proved of considerable value in accomplishing two objectives:

1. TO INCREASE OVERALL ECONOMY. With the use of Pennsalt iron phosphates, coverage per pound is greater. Control is simplified. Bath life is lengthened. Both cleaning and phosphatizing are often combined into one simple operation. The need for an alkali cleaner prior to coating is often eliminated. This reduces consumption of phosphatizing compound, reduces waste, makes solution control much easier.

2. TO IMPROVE PAINT COVERAGE. Fosbond "20" series iron phosphate coatings are especially suited where it is necessary to use 1-coat paint systems. Coatings produced with Fosbond show remarkable uniformity in coating weight and in performance. Corrosion test performance is proved consistently superior.

QUESTION—
How are iron phosphate Fosbonds applied?

ANSWER—
Usually in this simple three or four stage cycle:

Fosbond 22 → Fosbond 22 → Rinse → Fosrinse

QUESTION—
How do zinc versus iron phosphates compare as to materials handling?

ANSWER—
Pennsalt supplies Fosbond series "20" as a dry powder, instead of in liquid form. Packed in non-returnable drums, it is easier to handle than the liquids used in zinc phosphatizing. With Fosbond "20" there is only *one* material to buy, store, handle, use.

QUESTION—
Does Pennsalt offer any advantages over other iron phosphates on the market?

ANSWER—
Pennsalt believes that its Series "20" line delivers a superior cleaning action. Coatings are more uniform. The possibility of eliminating an alkali cleaner is more certain. Sold in *dry* form, Fosbond "20" guarantees savings in handling.

QUESTION—
Who is now using Fosbond iron phosphates to good advantage?

ANSWER—
Many leading manufacturers, among them Black & Decker, who report that their costs have been reduced and product quality increased with Fosbond. See opposite page for details.

For complete technical information about subjects briefed in the FOSBOND FORUM, or answers to your questions, write Customer Service Dept., Pennsylvania Salt Mfg. Co., 1064 Widener Bldg., Philadelphia 7, Pa.

Black & Decker Valve Refacers are used by better automotive shops throughout the country. The paint on these machines is anchored to the metal by the Pennsalt Fosbond Process.

Fosbond picked by Black & Decker for better adhesion of paint to metal

The Pennsalt Fosbond® Process for bonding paint to metal is used on a variety of Black & Decker products.

AMONG THEM:

- Valve Reconditioning Equipment for auto shops
- Steel Kit Boxes for home handymen
- A new B & D portable electric Hammer display
- Pedestals for 6″, 8″ and 10″ Heavy-Duty Bench Grinders
- Various stands, cabinets, bases

Black & Decker reports their cost of cleaning metal before painting has been reduced. Better adhesion of paint to sheet metal surfaces has been obtained, and rust-resistance after painting is greater.

For better phosphatizing . . . to get a better start for your finish . . . check the Pennsalt Fosbond Process. There's an extra advantage in the Fosbond-Good Housekeeping seal which is available for merchandising use. A one-hour survey may improve your products, may make selling easier. Just write: Customer Service Dept., Pennsylvania Salt Mfg. Co., 1064 Widener Bldg., Philadelphia 7, Pa.

Pennsalt Chemicals

Pennsylvania Salt Manufacturing Co.

ASTM COMMITTEE ON PORCELAIN ENAMELS MEETS AT G-E

Committee C-22 on porcelain enamels, American Society for Testing Materials, were guests of the General Electric Co., Louisville, Ky., on February 2 and 3. J. A. Schiefferle served as host. Approximately 50 of the nation's technical leaders in the porcelain enameling industry, representing an even balance between raw materials suppliers, producers and general interest members, comprised the group.

The highlight of the meeting was the work of subcommittee II on nomenclature, under the direction of chairman E. E. Howe, director of research, The Chicago Vitreous Corp., Cicero, Ill., which included the development of tentative definitions for porcelain enamel and ceramic coatings. These definitions were as follows: porcelain enamel — a vitreous inorganic coating bonded to metal by fusion at or above red heat; ceramic coating — an inorganic essentially non-metallic protective coating for metal.

Officers of Committee C-22 are as follows: chairman, William N. Harrison, National Bureau of Standards, Washington, D.C.; first vice chairman, Dwight G. Bennett, University of Illinois, Urbana, Ill.; second vice chairman, Ralph F. Bisbee, Westinghouse, Mansfield, Ohio.

Secretary, Dr. George H. Spencer-Strong, Pemco, Baltimore, Md.; chairman of subcommittee I on research, Dr. J. J. Canfield, Armco, Middletown, Ohio; chairman of subcommittee II on nomenclature, E. E. Howe, Chicago Vitreous, Cicero, Ill.; chairmen of subcommittee III on education, Loran S. O'Bannon, Battelle Memorial Institute, Columbus, Ohio; chairman of subcommittee IV on raw materials, Wayne A. Deringer, A. O. Smith, Milwaukee, Wisc.; and chairman of subcommittee V on finished products, Joseph C. Richmond, National Bureau of Standards.

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There's nothing like *vitreous color* on lightweight aluminum to make your product sell faster!

Du Pont Vitreous Enamel for Aluminum provides coatings in a wide range of colors and surface textures . . . gives aluminum products durable finishes that resist abrasion, thermal shock, impact and flexing.

Vitreous enameled aluminum can be sawed, sheared, drilled and punched without spalling, and because these rugged coatings add rigidity to aluminum sheet, you can use lighter gauge aluminum . . . cut your packaging and shipping costs.

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GAS FURNACE SHIPMENTS SHOW JANUARY GAIN

Shipments of gas-fired furnaces during January were 51% over January 1954, according to the Gas Appliance Manufacturers Association.

Edward R. Martin, director of marketing and statistics, reported that 46,800 gas-fired furnaces were shipped in January as compared to 31,000 units shipped in the same month in 1954.

'54 VACUUM SALES DOWN 4.3% FROM '53

Factory sales of standard-size household vacuum cleaners in December totalled 217,022 units, compared to 237,882 in November, down 8.8%, and topped sales in December, 1953, by 13.8%, according to the Vacuum Cleaner Manufacturers Association.

Total sales in 1954 amounted to 2,658,136 units, a decrease of 4.3% from 1953.

LUBRICATION ENGINEERING COURSE

The American Society of Lubrication Engineers has announced that a 5-session special short course in lubrication engineering will be held during their 10th annual meeting and Lubrication Exhibit in Chicago, Ill., at the Hotel Sherman, April 13-15, 1955.

NORGE NAMES EDWARDS

Appointment of J. J. Edwards as gas range sales manager of Norge

Div., Borg-Warner Corp., Chicago, has been announced by William C. Conley, director of product managers.

Edwards was previously with Magic Chef, Inc., St. Louis, Mo., for 16 years.

5 MEN BUY INTEREST IN LAU

Five executives of the Lau Blower Co., Dayton, Ohio, have purchased interest in the company from E. B. Lau and Marion E. Lau, founders.

They are: H. W. Faulkender, vice president; Thomas I. Byrd, vice president; Richard L. Perkins, controller; Charles E. Hubbard and Joseph L. Lair.

PREWAY APPOINTS QUINN

W. M. Quinn has been made assistant to the general manager, Preway, Inc., Wisconsin Rapids, Wisc., according to J. O. Ellis, president and general manager.

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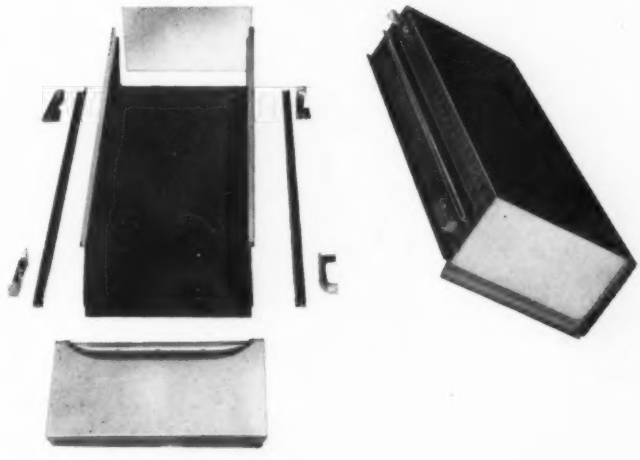
BUILD BETTER METAL OFFICE FURNITURE

SPECIAL WELDER COMPLETES 300 9-PIECE DRAWER ASSEMBLIES PER HOUR



Desk drawer units in the new General Fireproofing Generalaire* line of metal office furniture are assembled and welded on special automatic resistance welder designed and built by Federal.

Nine separate parts are spot and projection welded in this machine to produce a complete drawer assembly. Dual shuttle fixtures are employed permitting maximum utilization of the welder. While one fixture is being loaded and reloaded at one end of the machine, the fixture on the opposite end is in the welding station. With an operator at each fixture loading station, a total hourly production of 300 drawer assemblies can be obtained.

Built-in rapid adjustment that will accommodate four different drawer sizes and "swing out" gun mounts for easy maintenance are two of the many features designed into this machine. It's another reason why Federal **Stays — First in Resistance Welding.**

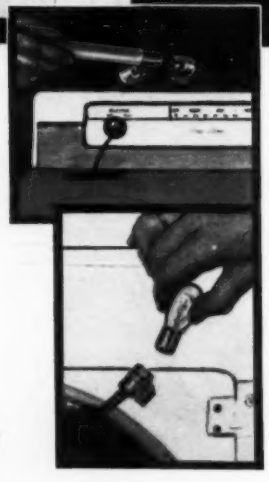
For further details write for special bulletin TD-22 or contact the Federal representative nearest you.

*TM General Fireproofing

Federal® WELDERS

Warco PRESSES®

The Federal Machine and Welder Company
WARREN, OHIO



More EFFICIENCY— More SALES APPEAL— for the NORGE Automatic Dryer with

DRAKE ASSEMBLIES

Two DRAKE-socketed lamps strategically placed on the Norge *"Time Line"* Automatic Dryer give this prize-winning appliance a finishing touch of utility and convenience which adds positive sales appeal for Mrs. Housewife. With these lamps, dryer controls and contents are easily visible at all times. DRAKE No. A1100 Double Contact Candelabra Bayonet Socket Assemblies are used.

You'll find DRAKE Assemblies giving extra use and sales values to many appliances in the Norge and other leading lines. DRAKE's advanced design, careful manufacture and low costs can give *your* product a "plus", too — let us quote on your job!

★ *To get a quick picture of DRAKE'S broad line, send for your copy of catalog F.*

DRAKE

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1711 WEST HUBBARD ST. • CHICAGO 22, ILL.
SOCKET & JEWEL LIGHT ASSEMBLIES

HELEN KENDALL ON BUILT-IN KITCHENS PANEL

One of the features of the 6th annual Appliance Technical Conference to be held May 23-24 at the Hollenden Hotel, Cleveland, will be a symposium on "built-in kitchens".

The symposium will be led by Miss Helen Kendall, of *Good Housekeeping*, with representatives of manufacturing companies participating in a panel discussion. Also on the program will be Glenn Beyer, director of the Cornell University Housing Center.

The conference is sponsored by the Committee on Domestic and Commercial Applications of the American Institute of Electrical Engineers.

SHARP TO SPEAK AT OHIO STATE CONFERENCE

John C. Sharp, president of Hotpoint Co., will be a guest speaker at the second annual Conference for Engineers and Architects to be held at Ohio State University, May 6. His subject will be "Tomorrow—The Engineer's Era."

Another featured speaker will be Gen. Curtis E. LeMay, commanding general, Strategic Air Command, U.S.A.F. His topic will be "Strategic Air Power".

The departments of the College of Engineering will hold technical sessions and open houses during the afternoon and evening. May 6 is also "alumni day" at Ohio State University.

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1 THE 1955 INDUSTRIAL FINISHING EXPOSITION

The first finishing show in three years . . . and it'll be jam-packed with exhibits. See all of the latest ideas for better finishing under one roof. Keep up-to-date in the fast-changing industrial finishing industry the easy way . . . by attending this big Exposition.

2 THE 42nd ANNUAL CONVENTION OF THE AMERICAN ELECTROPLATERS' SOCIETY

Don't miss this opportunity for a mutual exchange of ideas. This is your chance to see, hear and talk to all of the people who have contributed engineering advancements, research and know-how to industrial finishing.

ONE IDEA from the Exposition or Convention may save your company thousands of dollars!

Plan now to attend...
JUNE 20, 21, 22, 23, 1955

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HAROLD E. BARTLETT
Exposition Manager

1955 INDUSTRIAL FINISHING EXPOSITION
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RCA DEVELOPS AN ELECTRONIC COOLING SYSTEM

An electronic air conditioner, designed without any moving parts, motors or compressors, is on the way, according to Brig. Gen. David Sarnoff, chairman, Radio Corporation of America.

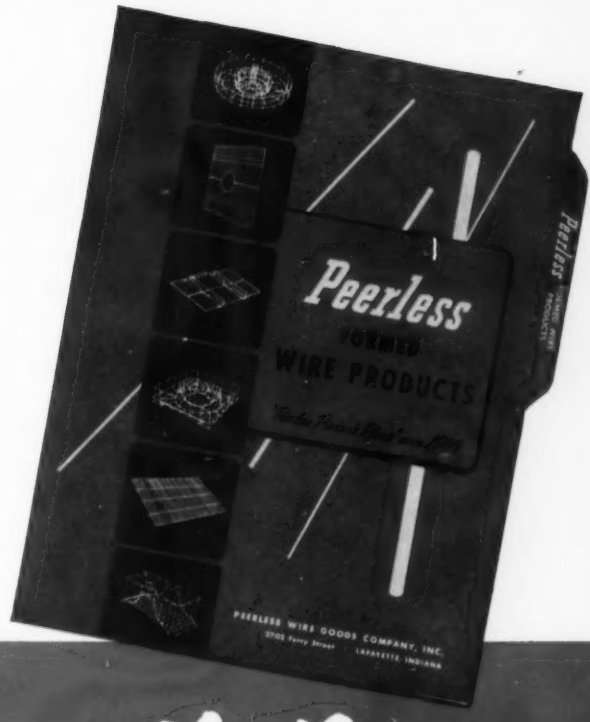
At the winter meeting of the American Institute of Electrical Engineers in New York City, Sarnoff reported on progress being made in the RCA Laboratories on an all-electronic cooling system. As evidence he presented a film of a small electronic refrigerator which is "the first result of research in this new field."

It is believed to be the first refrigerator to achieve practical storage and freezing temperatures entirely by electronic means, although the principle upon which it operates was discovered by the French physicist Jean Charles Peltier over 120 years ago.

Peltier observed that passage of an electric current through the junction of two dissimilar materials produces a cooling and heating effect in the region of the junction, depending upon the direction of the current.

The so-called "Peltier effect" has long been a scientific curiosity chiefly because of a lack of materials capable of producing temperatures sufficienty low for practical use in cooling or refrigeration, stated Sarnoff, who added that RCA scientists were able to approach the task with new knowledge provided by recent studies in solid-state physics.

Nils E. Lindenblad, of RCA Laboratories, is shown with experimental model of electronic refrigerator.



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THIS NEW 8-PAGE FOLDER ON *Peerless* FORMED WIRE PRODUCT FABRICATION

This new 8-page brochure shows the plant facilities for fabrication of Peerless' formed wire products . . . from wire storage room through shipping . . . from the simple forming operations through the most complex welding and assembly.

Peerless has been one of the foremost formed wire product fabricators since 1910. There's plenty to learn about Peerless' formed wire product fabrication from this booklet and . . . it's yours for the asking. Write today!

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PEERLESS WIRE GOODS COMPANY, Inc.
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SWART TO ALLIED PROBUCTS

Richard H. Swart, Sr. has joined the Allied Products Div., Carrier Corp., as director of engineering, it has been announced by Loren Fletcher, general manager of the division.

GAS WATER HEATER SHIPMENTS UP 4%

Shipments of automatic gas water heaters during 1954 totalled 2,285,000 units, second highest in history, according to the Gas Appliance Manufacturers Association.

Edward R. Martin, GAMA's director of marketing and statistics, reported the year's total was a gain of 4.7% of the 1953 total.

CROSLEY & BENDIX UPS KENNEDY

Terrence D. Kennedy has been appointed laundry field sales manager, Crosley and Bendix Home Appliances Divisions, Avco Mfg. Corp., Cincinnati, Ohio, succeeding James G. Koontz, who has resigned.

WHIRLPOOL UPS GRIMES AND FAIRMAN

Two promotions within the sales department of Whirlpool Corp., St. Joseph, Michigan, have been announced by Jack D. Sparks, sales manager. Frank Grimes, formerly head of sales training, is in charge of sales promotion, washer division. Howard Fairman, formerly sales training assistant, succeeds Grimes.

STRONG IS IRON FIREMAN PRES.

Wayne F. Strong has been elected president and chief executive officer, Iron Fireman Mfg. Co., Cleveland, Ohio.

He has been with the company for 26 years.

PERMAGLAS APPOINTMENTS

Three changes affecting top management personnel of the A. O. Smith

J. H. BRINKER

Corp.'s Permaglas Div. at Kankakee, Ill., have been announced by F. S. Cornell, vice president and general manager.

J. H. Brinker, director of marketing, becomes general manager of the division.

S. E. Wolkenheim, general sales manager, succeeds Brinker as director of marketing.

R. J. Shepherd, manager of water heater sales, fills Wolkenheim's post of general sales manager.

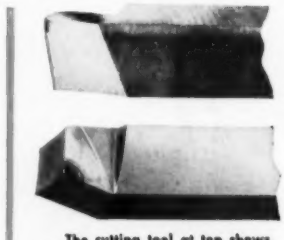
WESTINGHOUSE '54 EARNINGS 13.8% OVER '53

Record sales billed by Westinghouse Electric Corp., Pittsburgh, Pa., in 1954 boosted net income to the

• What is your operation? Gear shaping, high speed automatics? No matter . . . because Stuart Oil Company has a balanced cutting oil for you with just the right amount of lubricity, temperature control and chemical activity to provide the optimum in finish, production and tool life.

Stuart's Balanced Cutting Oils are made under laboratory control. You are assured of a uniform product that will produce the very best results obtainable under the conditions you will subject it to.

Perhaps you are blending your own cutting oils now . . . or using other types. Let a Stuart Representative, "the Man in the Barrel", explain and demonstrate a balanced Stuart Cutting Oil.
Fill in the coupon below today.



The cutting tool at top shows abnormal front clearance caused by excessive chemical activity of cutting fluid. The lower cutting tool shows cratering from insufficient chemical activity of cutting fluid.

More than a "Coolant" is Needed

D. A. Stuart Oil Co.
EST 1865 LIMITED

TIME-TESTED CUTTING FLUIDS AND LUBRICANTS
2747 S. Troy St., Chicago 23, Illinois
In Canada: Canadian D. A. Stuart Oil Co., Ltd.
3575 Danforth Ave., Toronto

CLIP TO YOUR COMPANY LETTERHEAD AND MAIL TO
D. A. Stuart Oil Company
2747 S. Troy Street, Chicago 23, Ill.
Have "the Man in the Barrel" call.
Send a Stuart's Cutting and Grinding Fluid Selector Folder.
NAME.....
TITLE.....

highest in the company's history, announced Gwilym A. Price, president.

Net income of $85,594,000 in 1954 was 13.8% higher than in 1953.

ILLES APPOINTED NORGE GENERAL TRAFFIC MANAGER

Appointment of Joseph A. Illes as general traffic manager, Norge Div.,

Borg-Warner Corp., Chicago, has been announced by V. C. Rice, vice president of manufacturing and engineering.

Illes will coordinate transportation relative to routes, rates, tariffs and centralized shipping activities of Norge appliances.

ADMIRAL NAMES FREMONT

Expansion of Admiral Corp.'s appliance merchandising department and the appointment of T. Stanton Fremont to the newly-created post of appliance merchandising manager have been announced by W. C. Johnson, vice president - sales.

AFFILIATED GAS EQUIPMENT AND CARRIER CORP. COMBINE

The merger of Affiliated Gas Equipment, Inc., into Carrier Corp. became effective March 1, it has been announced by Cloud Wampler, president and chairman of Carrier.

New directors of Carrier are Lyle C. Harvey, formerly president of Affiliated Gas, Francis H. Beam, senior vice president, National City Bank of Cleveland, and William A. McAfee, senior partner of the law firm of McAfee, Grossman, Taplin, Hanning, Newcomer & Hazlett, Cleveland, Ohio.

ANNOUNCE PROGRAM FOR ACS ENAMEL DIVISION SESSIONS

More than 1800 persons are expected to attend the 57th annual meeting of the American Ceramic Society in Cincinnati, Ohio, April 25-28.

Three major symposiums will be featured in the technical sessions, with several divisions participating in each. Symposium subjects are: "Ceramic to Metal Seals", "Fundamentals of Color and Color Measurements", and "Color Control in Ceramics."

Enamel Division technical sessions will be held at the Netherland Plaza, according to Eugene E. Bryant, Ferro Corporation, division chairman.

Papers to be presented at Enamel Division sessions include:

"Determination of Thermal Conductivity of Porcelain Enamels" by H. E. Robinson and J. C. Richmond, National Bureau of Standards.

"Solution Ceramics" by S. W. Bradstreet and J. S. Griffith, Armour Research Foundation.

"Effect of Ceramic Coatings on the Deformation of Alloys at High Temperature" by H. G. Lefort, J. S. Richmond and J. R. Cuthill, National Bureau of Standards.

"Effect of Temperature on the Elastic Properties of Porcelain Enameled Steel" by R. W. Cowan, A. W. Allen and A. L. Friedberg, University of Illinois. →

Chicago Rubber Company's amazing new R54 contact wheel cuts better—faster—longer and will substantially reduce your grinding and polishing costs 3 ways.

This precision machined and accurately balanced wheel is easily and quickly knocked down and reassembled for tire replacement or change.

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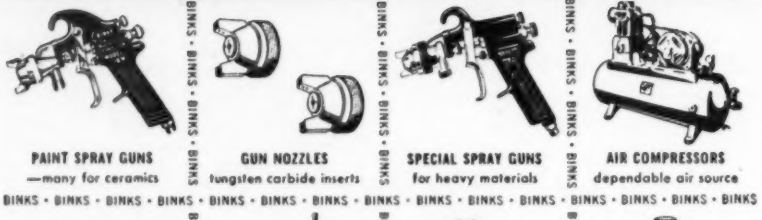

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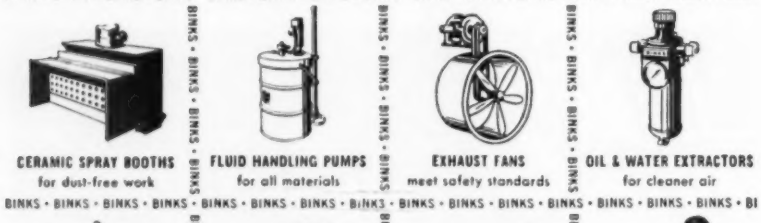

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SYMPOSIUM—"Fundamentals of Color and Color Measurement" — with papers presented by men from the University of Cincinnati, the National Bureau of Standards, and Hunter Associates Laboratory.

SYMPOSIUM — "Color Control in the Ceramic Industry" — including "Establishing a Color Control Program Utilizing Instrumentation" by R. F. Patrick, Pemco Corporation; "Color Control in the Porcelain Enamel Industry" by H. I. Becker, Jr. and F. L. Michael, General Electric Co.; and "Color Control in the Sanitary Ware Industry" by W. H. Merry, Richmond Radiator Co.

"Hydrogen Behavior in Glass Coating of Steels and Alloys" by G. P. K. Chu and E. A. Sanford, The Pfaudler Company.

"Relation of Viscosity, Nuclei Formation, and Crystal Growth in Titania-Opacified Enamel" by Tin Boo Yee and A. I. Andrews, University of Illinois.

"Surface and Sub-Surface Abrasion of Porcelain Enamels" by J. H. Giles, Porcelain Enamel Institute, and J. C. Richmond and W. N. Harrison, National Bureau of Standards.

"Torsion Tests Show Advantages of Thin Porcelain Enamel Coats" by F. W. Beall and R. L. Myers, Armco Steel Corp.

"Factors Influencing the Neutral Point of Porcelain Enamels" by Donald C. Bowman, Chicago Vitreous Corp.

"A Study of the Thermal Expansion of Enamel Glasses" by C. F. Tung and A. I. Andrews, University of Illinois.

"Thermal Expansion of Commercial Cast Irons and Enamels for Dry Process Enameling" by R. R. Danielson and D. V. Van Gordon, Metal & Thermit Corp.

"Method of Stress Determination in Porcelain Enamel Coatings" by G. E. Selby and Harry LaTour, Armco Steel Corp.

"Effect of Processing Variables on the Stress-Strain Relationship in Enamel-Metal Systems" by J. H. Lauchner, R. L. Cook and A. I. Andrews, University of Illinois.

"A Formulation Study of Lower Temperature-Maturing Titania Enamels" by J. F. Sincere, Jr. and A. L. Friedberg, University of Illinois.

PERFECTION CHANGES NAME

Perfection Stove Co. stockholders at their annual meeting voted to change the name of the company to Perfection Industries, Inc.

The scope of the company's operations, since adoption of the present name in 1925, has been broadened to include furnaces, space heaters, water heaters, winterization equipment, air conditioners, aircraft parts and other military equipment.

U. S. STEEL LAUNCHES "OPERATION WIFE-SAVER"

U. S. Steel Corp. has initiated the second major campaign in a series of customer relations promotions. Called "Operation Wife-Saver", it is an effort to assist in the development and expansion of the market for steel kitchen equipment, using the slogan "Make It a Wife-Saver — Make It an All-Steel Kitchen."

DORNBECK FURNACE PUMP DIV.

Establishment of a separate heat pump division headed by Harry F. Schultz, chief engineer, has been announced by Dornbeck Furnace & Foundry Co., Cleveland, Ohio.

WESTINGHOUSE TO MODERNIZE SPRINGFIELD PLANT

Westinghouse Electric Corp., Springfield, Mass., will spend more than $1,000,000 to modernize facilities for the production of soft drink bottle dispensers, dehumidifiers and water coolers, James R. Weaver, manager of the appliance division plant, has announced.

MACK TRUCKS ACQUIRES WHITE INDUSTRIES & RADIO SONIC

Mack Trucks, Inc. has acquired White Industries, Inc. and Radio Sonic Corp., New York manufacturers in the field of electronics for aviation, industrial and military applications, it has been announced by the Mack board of directors.

P. O. Peterson, president of Mack, said that the acquisitions are the first major step in a long range product diversification program.

BORG-WARNER '54 EARNINGS

Borg-Warner Corp., Chicago, has reported that 1954 was the second largest year in sales and the third largest year in net earnings in the corporation's history.

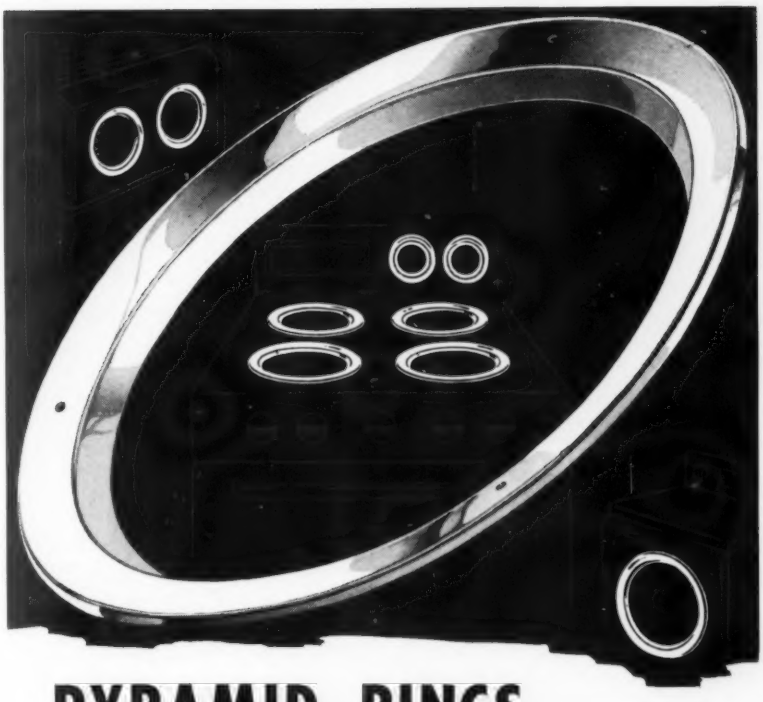
Income after taxes was $24,460,075 in 1954, compared with $23,978,142 in 1953.

KAWNEER NAMES HEADS OF PRODUCT DIVISIONS

A series of organizational changes in the Kawneer Co., Niles, Mich., providing a completely integrated product divisional organization, have been announced by Henry W. Zimmer, executive vice president. The company's operations are to be segregated into four product divisions.

Irving R. Seely, administrative vice president, is general manager, Architectural Products Division.

Wave B. Agler, formerly plant manager at Kawneer's aircraft plant,



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1931

Ferro produces first super-opaque Antimony frit, reducing the weight and thickness of P.E. cover coats.

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Subsequent research has revolutionized Porcelain enamels, reduced thickness of the finish by 73% in twenty years.

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IN CANADA: FERRO ENAMELS, LTD., OAKVILLE, ONT.

has been appointed general manager, Aircraft Products Division.

George H. Shevlin, Jr. will continue as general manager, Appliance Products Division.

Stephen A. Furbacher, formerly director of purchasing and assistant works manager, is general manager of the new Mill Products Division.

DYER, V. P. OF VITREOUS STEEL PRODUCTS, DIES

Brainerd Dyer, 71, vice president of Vitreous Steel Products Co., of Cleveland, Ohio, and Nappanee, Indiana, died recently.

Well-known throughout the porcelain enameling industry, Mr. Dyer had been with Vitreous Steel Products for over 30 years.

Following graduation from Amherst College, he taught school at St. Johnsbury, Vermont, before doing graduate work at the Massachusetts Institute of Technology. His first business associations were with Aluminum Co. of America and with National Carbon Co.

FRANK GIBSON TO SEAPORCEL

Seaporcel Metals, Inc., Long Island City, N.Y., manufacturers of architectural porcelain, has announced the appointment of Frank B. Gibson as vice president of production.

A veteran of 28 years in the porcelain enamel industry, Gibson was recently associated with the Association of American Railroads as ceramic specialist. Earlier he was associated with Servel, Inc. as superintendent of the porcelain division.

VIKING APPOINTS HARRIS

John E. Harris has been appointed manager of engineering, Viking Air Conditioning Div., The National Radiator Co., Cleveland, Ohio, it has been announced by Marion I. Levy, vice president and general manager.

WHIRLPOOL UPS WORTHINGTON

Chet Worthington has been appointed to the new position of parts and service manager, Whirlpool Corp., St. Joseph, Mich., it has been announced by John A. Hurley, vice president.

Worthington was formerly northwestern regional sales manager.

PENDER AMERICAN KITCHENS ASSISTANT GENERAL MANAGER

Marc W. Pender, former vice president in charge of sales, Magic Chef,

Inc., St. Louis, Mo., has been appointed assistant general manager, American Kitchens Div., Avco Mfg. Corp., Connersville, Ind., it has been announced by Curry W. Stoup, Avco vice president and general manager, American Kitchens.

Pender, who was a director and member of the executive committee at Magic Chef, spent 27 years with that organization and its predecessor American Stove Co.

CHAPMAN TO LYNN PRODUCTS

E. K. Priest, Lynn Products Co., Inc., Lynn, Mass., manufacturers of heating appliances, has announced the appointment of W. Gordon Chapman as sales manager.

HUSSMAN NAMES DICKSON, LINE TO ENGINEERING POSTS

John R. Caulk, Jr., vice president of manufacturing, Hussmann Refrigerator Co., St. Louis, Mo., has announced the appointments of Edgar V. Dickson as director of engineering and Richard A. Line as chief refrigeration engineer.

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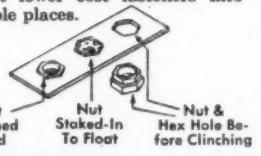
GRIPCO CLINCH NUTS
with the exclusive
hex on hex
feature

for "fixed" fastenings for "hard-to-reach" or blind assemblies. They wear longer, hold tighter, give greater customer satisfaction.

See how leading appliance manufacturers get lower cost fasteners into inaccessible places.



Gripco Clinch Nuts can be either clinched solid for a rigid application or staked in with a six point staking punch to give a floating effect. This floating effect takes care of misalignment and makes the application of the bolt easier. Gripco clinch nuts can be clinched or staked with stationary or portable hydraulic or air equipment. Details on request. Write for samples and data sheet.

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Automatic Washer for leg leveling and crating on all appliances

Tractor Seats

Power Lawn Mowers

Automobile Frames

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INDUSTRIAL OVENS
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* Actual photo of refrigerator plant production line where 11 joints are brazed on one assembly with less than 1% rejected under Underwriter's pressure test of 1500 lbs. per sq. in.

Alloy brazing materials insure a perfect job every time . . . consistently uniform, trouble-free brazing with no rejects . . . no reworking!

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Precision is of the utmost importance in successful brazing. For infallible results insist on precision-made Alloy Rings. Special Alloy packaging methods speed production and cut waste to a minimum.

Write for full information on brazing rings, preformed shapes, silver alloy, copper, soft solder and flux.

Alloy RINGS

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NEWS ABOUT SUPPLIERS

WHEELING STEEL SALES MGR.

Michael P. Apostolik has been named manager of Wheeling Steel Corp.'s New York district sales office, according to W. M. Hall, general manager of sales. Apostolik succeeds Harold W. Schroeder, who is retiring after 39 years of active service.

CHICAGO WHEEL NAMES OFFICERS

Chicago Wheel & Mfg. Co., manufacturer of grinding wheels and industrial abrasive products, has announced the election of Arthur T. Dalton, vice president in charge of sales.

Henry M. Mann, formerly treasurer and chief of sales engineering, has been elected secretary-treasurer.

NEW APPOINTMENTS AT G-E MINIATURE LAMP DEPT.

Selection of management personnel for the newly organized miniature lamp dept., General Electric's lamp div., has been announced by Kenneth G. Reider, general manager of the department.

The new department will be responsible for the development, production and marketing of all types of miniature lamps, including automotive and aviation lamps, and bulbs for appliances. National headquarters of the business will be at Nela Park.

VAUGHAN TO SORENG BOARD

Victor G. Vaughan has been elected to the board of directors, Soreng Products Corp., Schiller Park, Ill., announced Louis Putze, president.

Vaughan is a director of Metals and Control Corp., Attleboro, Mass., and president of Versailles Products Co., Versailles, Ky.

EXPANDED SERVICE PLANNED BY WYANDOTTE DISTRICT MGRS.

The 57th annual sales conference of J. B. Ford Div., Wyandotte Chemicals' district sales managers laid plans for expended sales and service activity in 1955. A broader product line and larger service staff will be programmed.

The conference was held at the St. Clair Inn, Michigan, and was followed by regional meetings in Philadelphia, St. Louis and San Francisco.

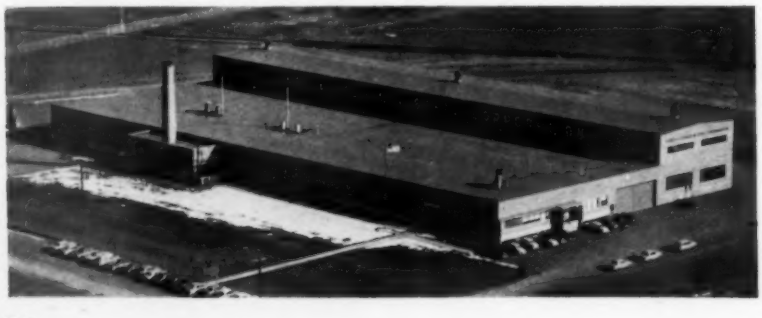
BINKS SPRAY PAINTING SCHOOL

The spring sessions of the Binks Spray Painting School will be held April 4-8 and May 2-6.

Included in the one-week course are discussions of such equipment as paint circulating systems, fluid handling pumps, oil and water extractors, flock equipment, compressors and all auxiliary equipment.

Instruction is given by William Beachman, paint chemist and spray painting authority, who is director of the Binks research department.

New Jones & Laughlin plant *— housing the warehouse and container division in Lancaster, Pennsylvania. Jack K. Kreutzer is resident manager of the new warehouse, and Thomas E. Freshour is superintendent of the container division plant. The 100,000 square foot building is located on a 13-acre site.*



ARTHUR T. DALTON

W. R. ARMSTRONG

SMITH JOINS HOMMEL

The O. Hommel Co., Pittsburgh, Pa., has announced the appointment of Loran E. Smith as sales and service engineer, with headquarters in Los Angeles. His territory will include the central and southern California regions.

ARMSTRONG TO PHOTOSWITCH AS SALES MANAGER

The appointment of William R. Armstrong as sales manager, Photoswitch Div., Electronics Corp. of America, Boston, Mass., has been announced by Burton E. Shaw, vice president of the division.

Armstrong was most recently sales manager of the Automatic Heating Controls and Motors Div., Soreng Products Corp., Chicago, Ill.

PENNSALT PRESIDENT TO RETIRE, DRAKE NAMED EXECUTIVE V P

George B. Beitzel, president, Pennsylvania Salt Mfg. Co., Philadelphia, Pa., has expressed to the board of directors his desire to retire when he completes 25 years' service with the company.

He has recommended that William P. Drake be appointed executive vice president and elected to board membership. Both recommendations have been approved.

LORANE SMITH

ROBERT F. LIEPSNER

H. W. SCHROEDER

LESLIE D. CATLIN

M. P. APOSTOLIK

HENRY M. MANN

BEARD TO TURCO CHEM-MILL, METAL PROCESSING POSTS

Appointment of Archie K. Beard as manager of the metal processing division and eastern divisional manager of the new Chem-Mill division has been announced by S. G. Thornbury, president of Turco Products, Inc., Los Angeles, manufacturers of specialized chemical processing compounds. Beard will headquarter at Turco's eastern plant in Newark, N.J.

AMERICAN EMBLEM NAMES CATLIN GENERAL SALES MANAGER

Earle Congelton, president, American Emblem Co., Utica, New York, has announced the appointment of Leslie D. Catlin as general sales manager.

Catlin was previously associated with a consulting engineering firm in Philadelphia.

NEW MULTI-MILLION DOLLAR ALUMINUM ROLLING MILL

D. A. Rhoades, vice president and general manager, Kaiser Aluminum & Chemical Corp., Oakland, Calif., has announced the award of a site preparation contract launching actual construction of its multi-million dollar aluminum sheet and foil rolling mill near Ravenswood, W. Va.

Work will begin immediately on the contract calling for clearing and grading a 40-acre site. Construction of the 990-foot long main mill building on the site is scheduled to start April 15.

Production from the plant is scheduled to begin by mid-1956 at an initial annual capacity of 72,000,000 pounds. Eventual annual capacity of the new plant when completed as a fully integrated rolling mill will be 250,000,000 pounds of commercial sheet and foil products, according to the announcement.

TIGHE TO LUX CLOCK

Fred Lux, president, Lux Clock Mfg. Co., Waterbury, Conn., has announced the appointment of James M. C. Tighe as commercial sales manager.

Tighe was formerly assistant general manager, Hub Distributors, Boston.

GLIDDEN NAMES MILLER

Appointment of Lowell H. Miller as an industrial sales representative for the Nubian Industrial Div., The Glidden Co., Cleveland, Ohio, has been announced by Thomas N. Armel, national industrial sales manager.

N. W. CHEMICAL NAMES HUGHES

Joseph R. Hughes has joined the sales and engineering staff of Northwest Chemical Co., Detroit, Mich., to service accounts in Massachusetts and Rhode Island, according to A. M. Gurley.

INLAND STEEL NAMES FAUSCH

James C. Fausch has been named manager of the New York district sales office of Inland Steel Co., Chicago, Ill. He was formerly assistant manager of the tin plant and export sales division in Chicago.

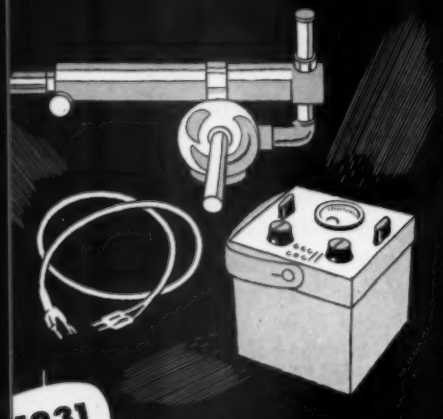
PENNSALT OPENS NEW PLANTS

The Pennsylvania Salt Mfg. Co. has announced the opening of a new plant at Delaware, Ohio. This plant is

Ferrod wins safety awards — *Plant officials and employees of Ferrod Mfg. Co., Batavia, Ill., have received from Ferro Corp. two safety awards for working an entire year without a disabling lost time injury. They are the C. D. Clawson Award, established by C. D. Clawson, Ferro president, and the W. R. Tuttle Award, in honor of the late W. R. Tuttle, once president of 3 Ferro subsidiaries. From left to right: A. L. Searcy, superintendent; Russell Frank, safety director, Ferro; E. B. Rutledge, acting treasurer; H. F. Bond, executive vice president; Merritt F. Myers, plant manager; and J. L. Sullivan, president of Ferrod.*

1920 FERRO 1955

A business grown big through SERVICE

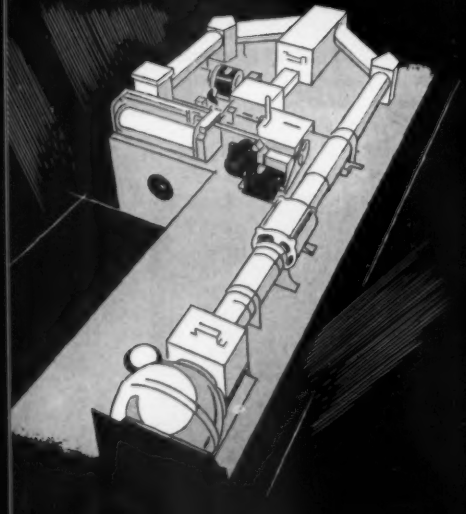


1931

Ferro develops first accurate measurement of Porcelain enamel reflectance (or opacity).

1955

New electronic equipment permits Ferro Researchers to measure both color and reflectance to 2/10ths of 1% accuracy.



FERRO CORPORATION

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IN CANADA: FERRO ENAMELS, LTD., OAKVILLE, ONT.

Pennsalt's 13th production facility. A similar installation is nearing completion at Chicago Heights, Ill. These plants will serve as blending, packaging and warehousing centers.

COOK PAINT & VARNISH NAMES LIEPSNER ASST. VICE PRESIDENT

Lathrop G. Backstrom, president, Cook Paint and Varnish Co., Kansas City, Mo., has announced the election of Robert F. Liepsner to assistant vice president.

SAMPAIR TO 3M BOARD

Election of Clarence B. Sampair to the board of directors, Minnesota Mining & Mfg. Co., St. Paul, Minn., has been announced.

He is vice president in charge of production and industrial relations for the parent company and president of the international division.

NATIONAL LEAD BUYS SOUTHERN SCREW

National Lead Co., New York City, has acquired the capital stock of Southern Screw Co., Statesville, N.C., through the exchange of stock.

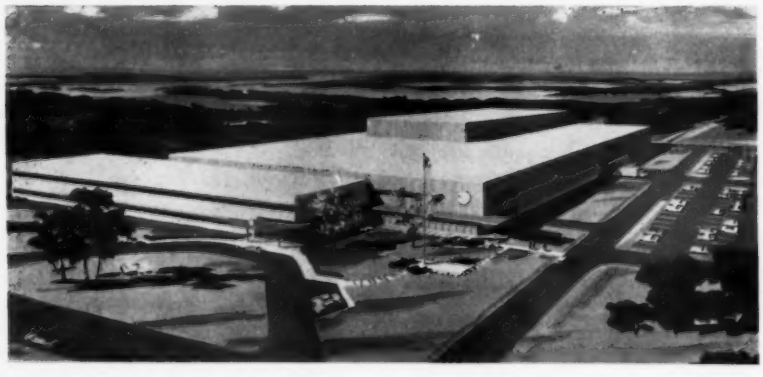
Southern Screw is a manufacturer of wood and metal screws.

SIMPSON OF ROBERTSHAW-FULTON RETIRES

Announcement has been made of the retirement of Samuel R. Simpson, assistant vice president, Robertshaw-Fulton Controls Co., after 35 years of active service at the Bridgeport Thermostat Div.

G-E TO BUILD PLANT IN TEXAS FOR HOME COOLING UNITS

Tyler plant to represent an investment of $15,000,000



General Electric Co. has announced plans for building a new plant in Tyler, Texas, for the manufacture of home cooling units. Representing an investment of $15,000,000, the new G-E installation will be the company's first major manufacturing plant in Texas, and will constitute the fourteenth large facility to be established by G-E in the South.

S. J. Levin, general manager of the company's home heating and cooling department, said the projected plant is needed for expanded production of home cooling units. In the last two years G-E central home cooling sales have increased ten times, he added.

Several hundred persons will be employed in the plant which will have about 350,000 sq. ft. of floor space in a single-story manufacturing building fronted by an office building. The plant will be completely air conditioned, added Levine.

Upon completion of the new Tyler plant in the fall of 1956, the company will have three facilities devoted exclusively to home cooling equipment, oil and gas-fired boilers and furnaces, and central home air conditioning units. The other two plants are located in Trenton, N. J., and Bridgeport, Conn.